

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL
FOUNDED 1880

A COPPER DOME

This artistic piece of copper work adorns the peak of the new city hall in Shaker Heights, Cleveland, Ohio. The details show much intricate design and exceptional workmanship. The dome carries out the style of the building—Colonial. Full details of the job appear in this issue.



NOVEMBER 8, 1930



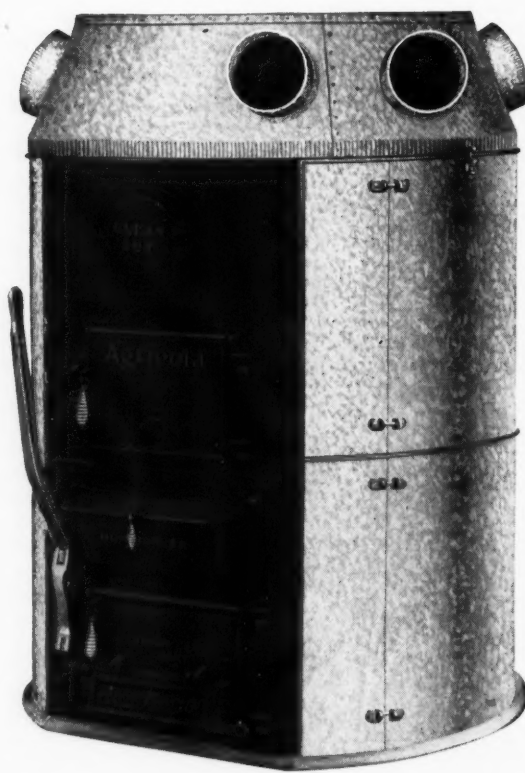
Stands for



whose outstanding progress in the past five years has earned for it a position of leadership in the industry.

Many dealers in all sections of the country are taking advantage of the profitable business which their connection with Agricola develops. You too will find that it pays to line up with the leader.

There is no time like the present in which to get started. Your telegram or letter will bring the facts.



AGRICOLA Furnaces are made in one of the largest and most modern furnace plants in America. Only the highest quality materials and skilled workmanship are employed in their manufacture

AGRICOLA FURNACE COMPANY, INC.

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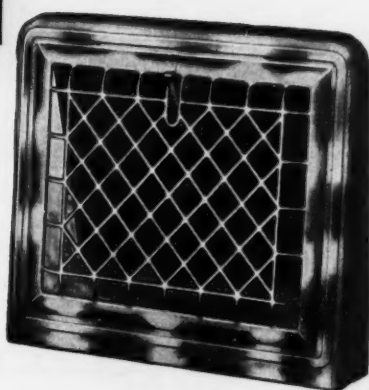
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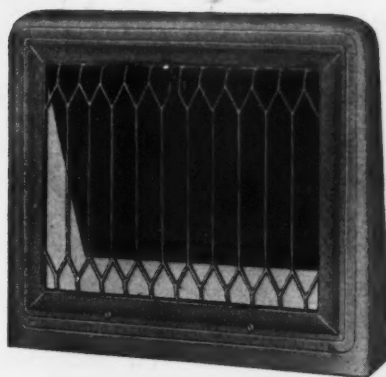
National

NATIONALS—

Deeply embossed, narrow fret work; greatest beauty and capacity. With removable face.

PANAMA—

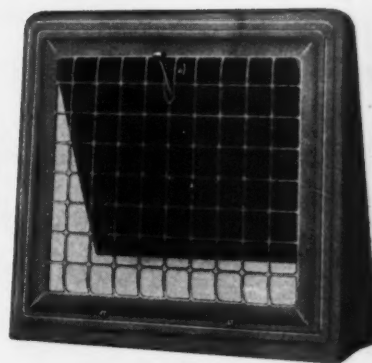
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Supply Houses—

Wherever Warm Air Heating Plants are Installed.

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INDEX PAGES—12 and 64

[VOL. 99, NO. 23—\$2.00 PER YEAR]

BUYERS' DIRECTORY—60 and 62



TONCAN WILL TAKE YOU OUT OF THE PRICE JOB CLASS

When all other arguments fall on deaf ears, close the sale by saying — "This bid is based on using Toncan Iron."

Right away you have lifted your work out of the cheap-job class. Users of sheet metal know that Toncan Iron is longer lasting — that it resists rust and corrosion — is most economical in the end. Tell them how little this unusual alloy of iron, copper and molybdenum adds to the cost of sheet metal work and watch your business improve.

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GENERAL OFFICES  YOUNGSTOWN, OHIO

Say you saw it in AMERICAN ARTISAN—Thank you!

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Sunbeam dealers, since the middle of the year, have sold and installed more Sunbeam Furnaces, than during the corresponding period of 1928 and 1929. In spite of depression with resulting hesitancy in buying, the cold figures definitely show that there is an enlarging market and increasing demand for these modern heating plants.

One logical explanation for this increase is found in the advanced design, heavy construction and careful manufacture of Sunbeam Furnaces—reasonable prices—productive selling helps—and financing terms. But much of the credit is due to the progressive heating merchants who have been attracted to the Sunbeam line.



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For Every
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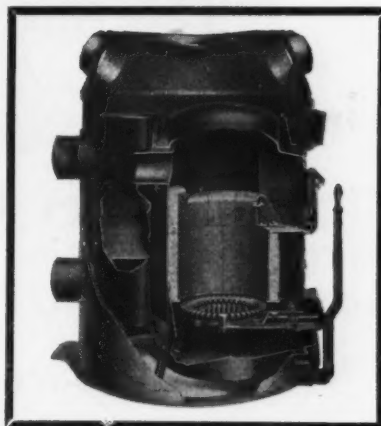
SUNBEAM WARM-AIR FURNACES

**Quality and
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Sunbeam economies start with large scale purchasing power and continue through enormous 25 acre plant equipped with every device to produce furnaces of the highest grade, speedily, carefully and at low cost. Because of the large volume in which they are produced, you pay no premium for quality in Sunbeam Furnaces.



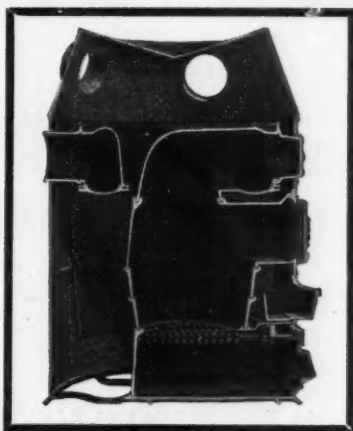
**1000 Series
Sunbeam**



**The Steel
Sunbeam**

Sunbeam cast iron furnaces range in size from 18" to 30" fire pot diameter. The Steel Furnace line extends from 20" to 34" diameter of drum. These heating plants are new in design and incorporate every improvement that you could desire.

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*A Division of the American Radiator and
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Please send your selling proposition and a copy of your 40 page Heating Manual to

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Address.....

A-12

Mention *AMERICAN ARTISAN* in your reply—Thank you!

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Business***

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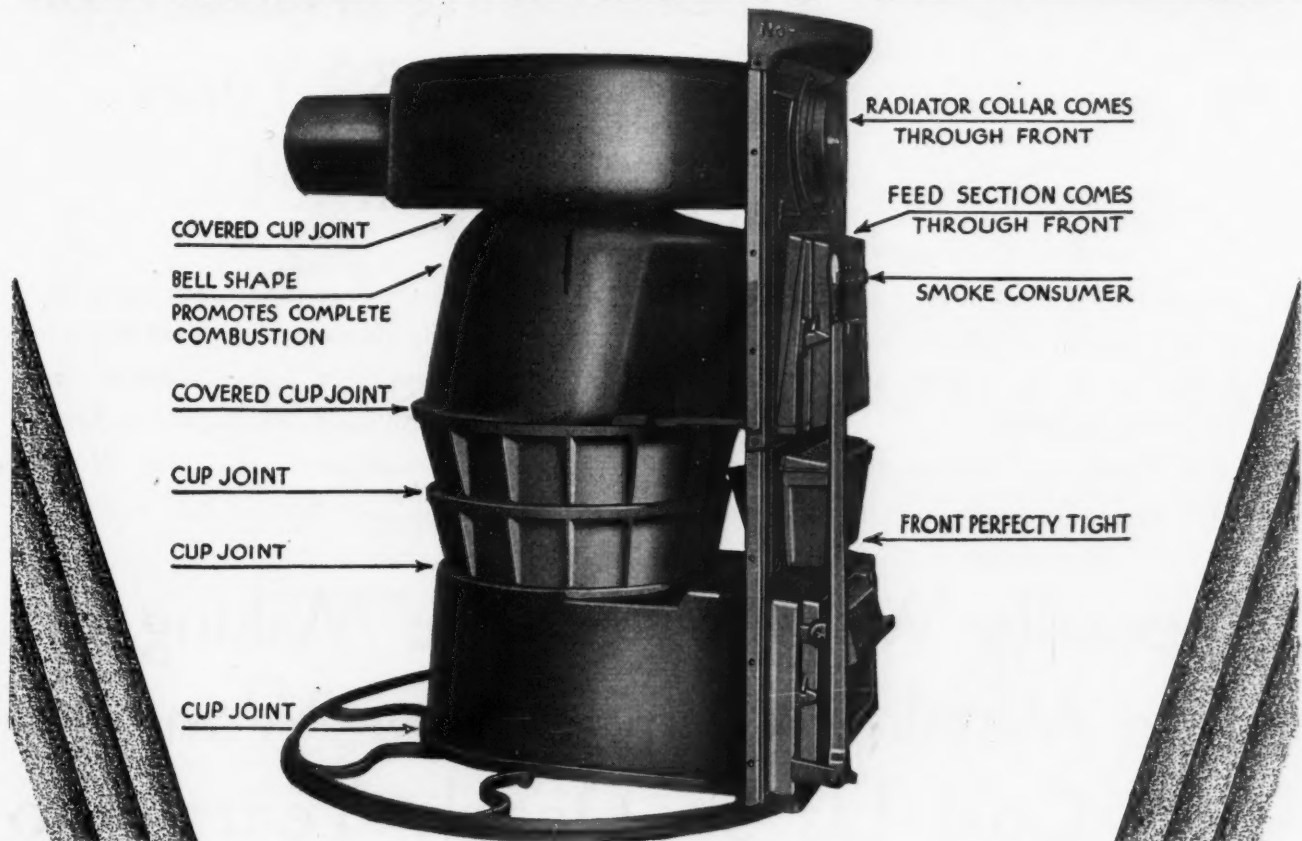
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THE SAME THOROUGH DESIGN GIVES TIGHTNESS AND SPEED IN SETTING



"TIGHT" is right. You know how women hate a dirty house. From bottom to top, the New NIAGARA Warm Air Furnace is designed to keep a house clean.

All parts are shaped to minimize "dirt." The "roof" of the feed section slopes up and back to carry away smoke when firing. An extra wide radiator throat decreases soot. The NIAGARA smoke consumer, an integral, built-in part of the furnace, keeps unburnt gases from wasting up the chimney.



You're his information Bureau. To the average householder, a furnace is a place to which he shivers his luckless way in the dead of winter and starts a fire. Show him how tight and superior the NIAGARA is. He'll thank you.

Now look at the illustration. Five cup joints; two of them covered joints above the fire line, prevent smoke, soot, and

gases from escaping. They divide the furnace into easily handled units. They also form a doubly strong seat for cement.

Radiator collar and feed section extend beyond the front. Thus another set of "cracks" is eliminated. The fronts fairly snap into position.

And the beauty part of it all is that these very features which make the New NIAGARA so **tight** make it almost leap together in assembling. And these same examples of far-sighted design which sell the householder and shorten installation time pile up liberal profit for the alert NIAGARA dealer.

Better let us give you the full story.

THE FOREST CITY-WALWORTH RUN FOUNDRIES CO.

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NIAGARA

WARM AIR HEATING SYSTEMS

Mention AMERICAN ARTISAN in your reply—Thank you!

Back in 1920 We Made a Mistake— After Having Made Weir Furnaces for 39 Years Up to That Time!

It was a very costly mistake—it cost us many thousands of dollars—and many more thousands to correct it with new machinery and methods.

For that reason, we feel we are to be pardoned if we “get a laugh” out of the claims

of some furnace manufacturers who have made cast-iron furnaces for years and who, now that they have “gone modern” and are making STEEL furnaces, announce their new “creations” as “The World’s Greatest” and “The Best of All.” . . .

Especially When They Are Making the Same Mistake in Their New “Wonders” That Cost Us So Dearly Years Ago



Notice that the WEIR
Furnace is both Riveted
AND Welded

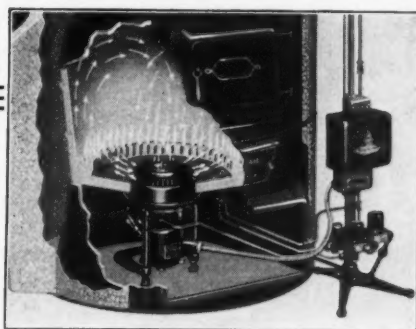
49 years is a long time—but we are still learning—and out of the 49 years, the most valuable thing we have learned is that

There Is
No Substitute for
Experience

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FURNACE COMPANY**

1300 S. Washington St., Peoria, Ill.

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AT LAST!

The TRUTH about the "Wiping WALL-FLAME"

Most important of the mechanical reasons why you should COMPLETE every installation with a Silent Automatic oil burner . . . and pocket two profits . . . is the fact that Silent Automatic alone has the "Wiping WALL-FLAME".

The "Wiping WALL-FLAME"

This slowly swirling flame constantly licks the entire wall of the fire-pot at grate level. The result is maximum over-all heating efficiency. Because of the quality of this slow flame, the furnace lasts longer. Moreover, this flame burns softly . . . it is never disquieting.

The "Wiping WALL-FLAME"

Because the "Wiping WALL-FLAME" enables the burner to work at peak efficiency, all the time it is running, heat is obtained just as fast as it is needed, even in quickly responsive warm air systems.

The "Wiping WALL-FLAME"

Home-owners are familiar with the principle and advantages of the "Wiping WALL-FLAME", because working with coal furnaces has taught them how maximum heating efficiency is obtained. Many warm air furnace men are boosting their profits with "Silent" and its "Wiping WALL-FLAME". 28% of all "Silent" installations are made in warm air heating plants. It's up to you.

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can**

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5	Erect air ducts . . . attach asbestos covering to ducts
6	Install furnace pipe . . . assemble furnace casings
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8	Fabricate window and panel guards
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NEW!
*the Moncrief
Steel Furnace*

SELLING—Installing—
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made a lot easier for the
man who sells Moncrief
Furnaces. They look good
to the prospective buyer,
go up smoothly and quickly

in the basement, and give
such genuine satisfaction
as to generate more sales
among the owners' friends.

Good time to take on the
Moncrief line.

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Heating Job*

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Stockhoff Supply Co., St. Louis, Mo.
Follansbee Bros., 324 South Missouri Street,
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The SERIES "C"

MONCRIEF

Mention AMERICAN ARTISAN in your reply—Thank you!

Founded 1880

American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL

Published Every
Other Saturday

Covering All Activities
IN

Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Industrial Roofing
Merchandising
Ventilating

The first story of this issue, the one about Herman Engberg, contains an idea that whole lot of you readers can well afford to follow. Perhaps some of you have. If so, let's keep this demonstration thing going. Tell us about your's.

* * *

Platte Overton takes time out in this issue to answer some questions sent in following publication of his first article on "Simplified Engineering. Don't get impatient for he's all set to give us another next issue.

* * *

We're still going strong on Overhead. But we would like to hear from some more of you men. How do you figure Overhead and do you get your profit from the way you figure.

* * *

There's some mighty interesting details in the story on the copper work on the Shaker city hall. This is not a big job, but it certainly shows nice workmanship. Our friend Bill Feiten did the job.

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NOVEMBER 8, 1930

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"I'll Be D-----d If I Pay"

Says the Man At the Left.

"Enclosed Please Find Check"

Says the Man At the Right.

YOU can't bame a fellow for yelling bloody murder and saying, "I'll be d-----d if I pay," when he has spent his hard earned money for a heating system and the aforesaid heating system fails to do its stuff. It's enough to make a person breathe fire and brimstone.

And what about the dealer? Do you think he is worrying about it? If you are a dealer, you know darned well you worry!

There's the worry about what you can do to fix the job. There's the worry about other people getting an ear-full of what a rotten furnace you installed. There's the worry about when you are going to get paid for the job. There are a heck of a lot of worries.

We don't say that Premier Dealers *never* have a kick

about a Premier not heating like it should. But we do say that such cases are so few and far between that it's almost a welcomed diversion when they do turn up.

Premiers are capable of doing a whole lot bigger heating job than they are rated to do. Cases are known where the Premier has been two sizes under Standard Code requirements and still was able to drive the folks out of the house when

the least little bit too much fuel was added.

And think of the sales end of it! When a job *doesn't* work right, the whole town hears about it. When it *does* work right it's not broadcast as much, but still plenty of people hear about what a good furnace that Premier is and they buy their next furnace accordingly.

The absolute dependability of Premiers is just another reason why we say that the Premier Agency is that honest-to-goodness agency you should have. If there is a Premier Dealer in your town, how well you know it! If there isn't a Premier Dealer in your town, why not spend a postage stamp for the complete details. We won't send a man unless you want him—the details will be sent through the mails. Why not write NOW!

PREMIER
WARM AIR HEATER CO.
Dowagiac, Michigan, U.S.A.

"Premier—the Furnace with Every Famous Feature"

Mention AMERICAN ARTISAN in your reply—Thank you!

Can you think of a better guarantee for a furnace than a 10-year guarantee that INCLUDES THE GRATES? That's the way Premiers are guaranteed and one of the big reasons why Premier Dealers are THE Dealers in their communities.

ARMCO

INGOT IRON

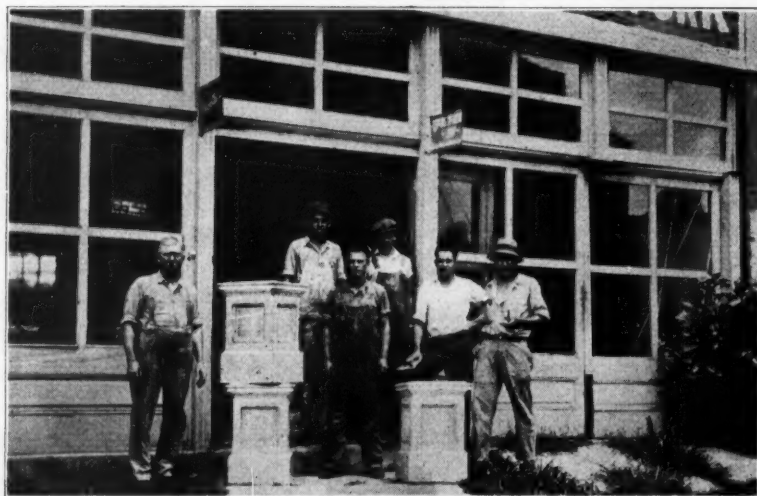
---the sheet metal that *builds business*

WHEN you use and recommend Armco INGOT IRON, regularly, you can depend on a steady upturn in business volume year after year. It is easier to sell than unknown products. Your customers and prospects are familiar with its durable, economical merits. Sixteen years of national advertising backed by twenty-two years of satisfactory service have convinced the public that Armco INGOT IRON is the safe and inexpensive metal to use.

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C. W. Vanatta, well-known sheet metal contractor of Columbia, Missouri, is an enthusiastic user of Armco INGOT IRON. He is shown here (at the right) with his workmen, while fabricating a difficult construction job for a fraternity house at the University of Missouri.

a complete stock of all standard sizes and gages of Armco INGOT IRON sheets and formed products. Get in touch with him; he will be glad to fill your needs on short notice.

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“BE SURE IT’S MADE OF ARMCO INGOT IRON”

Say you saw it in AMERICAN ARTISAN—Thank you!



American Artisan

THE WARM AIR HEATING
AND SHEET METAL JOURNAL



Vol. 99

CHICAGO, NOVEMBER 8, 1930

No. 23

What's Ahead for Sheet Metal?

AS the 1930 construction season draws to a close, it may not be amiss to set down some impressions of the sheet metal industry gained in a year of traveling here and there across the country.

The picture presented this year is a confusing one. This has been a year of great contrast and conflicting reports. By and large there has been a decided falling off in small building and home construction. Probably the volume of large building contracts has decreased also.

It is our impression, nevertheless, that in practically every community there has been one and more large buildings built this year. Some of these have been office buildings, there have been a number of large churches, school and public building construction has maintained a noticeable volume, and large home construction has been appreciably strong in most parts of the country.

Undoubtedly the most favorable trend for the sheet metal industry has been the widespread use of metal for architectural adornment, trim and style. Proof of this statement can easily be verified by jotting down here some of the metal sheathed buildings reported in *AMERICAN ARTISAN* this year.

There is the Chrysler building in New York. The Bank of Manhattan is another equally interesting. In Milwaukee two new churches have roofs of metal. In the cities of New York state there are a number of office buildings making lavish use of metal. In Chicago, there have been several buildings using much metal. Philadelphia, Pittsburgh, Detroit and St. Louis have little to show, but if present plans come to a head will spurt in 1931.

What does this use of metal signify? There is every reason to believe that this trend indicates that architects are turning to metal, especially the new metals, for expressing the latest ideas in adornment.

This trend to the use of metal began in Europe several years ago. In Germany, particularly, metal

and the new forms of architecture have hand in hand developed totally new forms of buildings. It is natural that some of this use of metal should find favor with our architects who are looking for new materials to use to express their ideas.

It is certainly permissible to assume that the use of metal by large city architects, who have the opportunities to travel and study the movement abroad, should be transmitted to the architects of smaller communities. It has always been so and rightly may be taken as a guide to what to expect in the future.

There is today, a very decided movement to decrease the weight of our large structures. For years past we have been making floor and partition construction lighter. There is not a great deal further to be done along these lines. The next, and greatest, field for decreasing weight, is in the structural framework and exterior protection. Of the two, the exterior wall offers the best opportunities at present.

This trend has made itself felt in the wide use of metal spandrels. By using metal spandrels, the weight of the curtain wall is determined by the weight of the spandrel and the window. With metal this weight is reduced greatly. This has been carried even farther in the Empire State Bank where the walls are composed of metal mullions, metal windows and metal spandrels.

In place of the heavy earthen adornment of the last fifteen years, sheet metal and spun metal work is now finding favor everywhere. Roofs, spires, towers, cornices and belt trim are now being designed in metal at a great saving in weight.

This saving in weight, coupled with the spreading desire to express architectural features in metal is undoubtedly going to do much to increase the use of metal. As uses spread and the intrinsic worth of metal comes into favor again, the sheet metal industry should once more assume the proportions of a major construction field.

Herman Engberg

USES HIS OWN FURNACE TO GET QUALITY BUSINESS

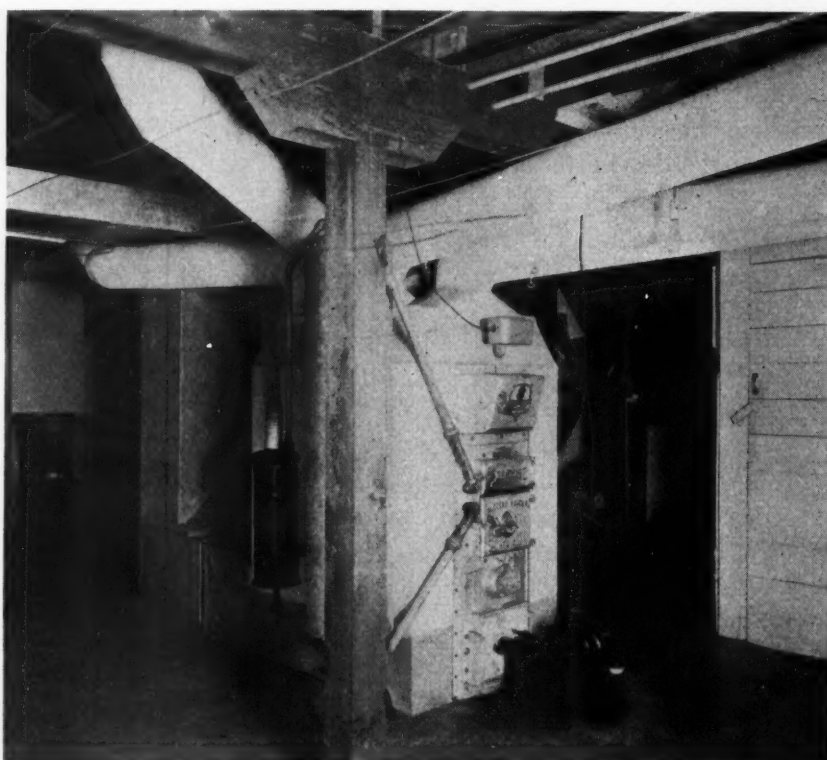
THIS is a story about a warm air heating man's demonstration house. The house is Herman Engberg's own home in Kearney, Nebraska. Doing sheet metal work in addition to heating, the house has a metal cornice, metal window boxes, outside lighting fixtures designed and put together in the shop, a kitchen table covered with metal, and many other details—all made up in the shop and incorporated in the house.

The idea of building a demonstration heating plant came to Mr. Engberg when he was working over plans for a new home. "I am in the business of selling warm air heating," said Mr. Engberg. "What I am primarily interested in is selling quality work at profitable prices. The kind of work I like best is a heating plant sold to a man who is willing to invest enough money to get the very best material and workmanship. How to interest this type of prospect so that he is willing to spend additional money for refinement is a problem.

"After mulling this over in my mind for several weeks I decided that the best way to sell an installation of this kind was to have a heating plant of this type that I could take the prospect to and explain all the details. Where could I find a better place for such a plant than in my own house where I could come and go any time of the day or evening, spend as much time as necessary, make as much noise as I wanted and take anything apart to show how it works if this is necessary. So when my new house was going up I built this model plant."

The effect of this house on the prospects is twofold. First of all, the heating plant was designed primarily to assist in making sales. Secondly, the mere fact that the heating man lives in the house and

ing to pay for the best in heating could find in this house every feature which goes to make a high-class warm air installation. In order to interest this class of prospect there were many unusual features



This is Herman Engberg's demonstration heating plant. It is in his own basement. Every effort was made to make this installation representative of the BEST to be had in furnace work. The installation has been a big help in closing sales. The plant uses an oil burner, fan and automatic humidification

finds the plant equal to his exacting criticism makes the prospect feel that if the plant works to the heating man's satisfaction it certainly has merit.

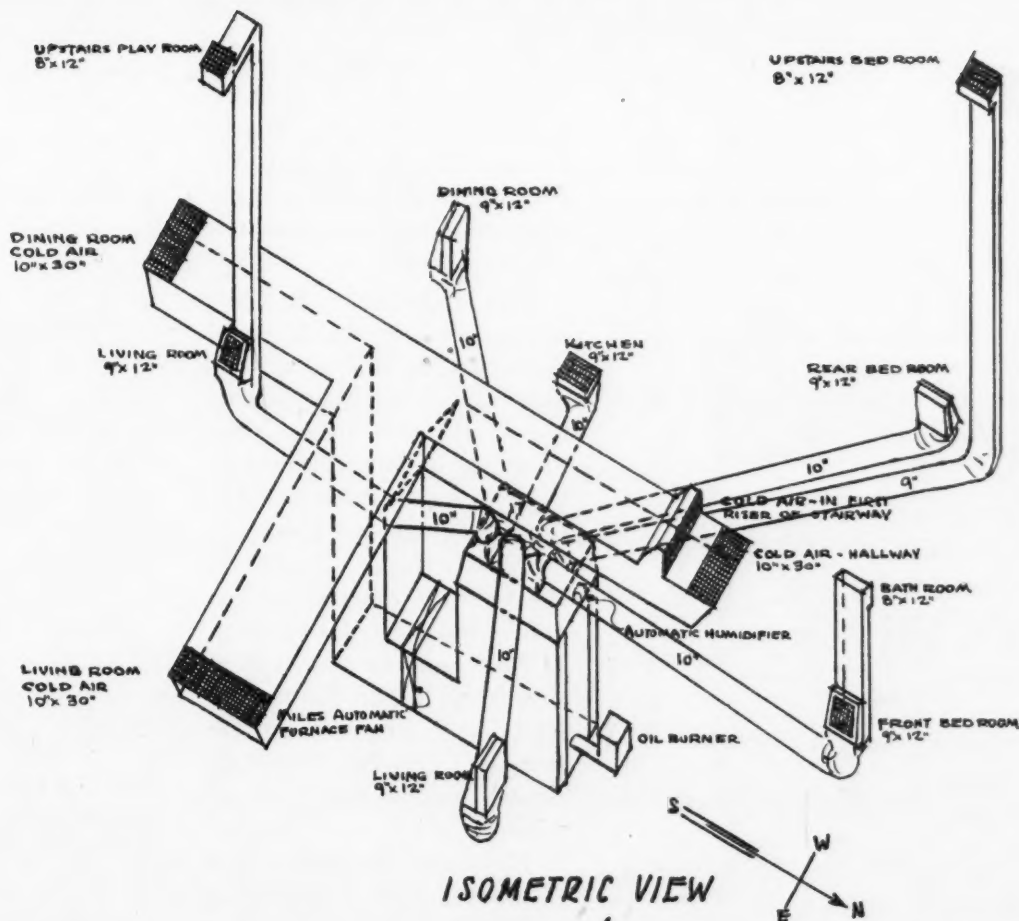
Since the demonstration plant was installed the house has been used to make sale after sale. Emphasis was laid primarily upon getting a quality job so that the prospect will-

incorporated in the design of the plant.

First of all, the furnace uses an oil burner. Mr. Engberg felt that oil heat was something every man willing to pay for automatic heating would be interested in. So he designed the furnace to use oil.

Then the casing, in place of the usual round casing, is built square,

This isometric drawing shows the layout of the demonstration heating system. The system has every feature our best minds emphasize—short leaders, compact return air, plenty of grille area and good workmanship.



the outside is all smoothly painted, and, in addition, paint was also put on all the warm air leaders. The return air ducts were not painted, but the very highest grade of metal work was done on all the seams, elbows, and so on. A glance at the picture of the furnace shows that every section of the return air duct

was creased to add to the appearance of a finished job. These points are often passed by in putting in a furnace, but Mr. Engberg wanted everything which might help to emphasize his workmanship and ability to do good work.

There are some features in this installation which bear emphasizing.

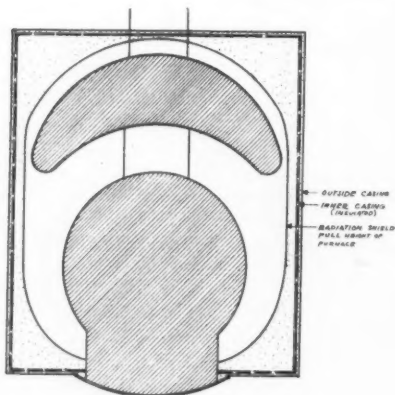
First of all, the casing. Mr. Engberg says: "In all my experience with the steel furnace in a round casing, I have felt that there is too much air space around the furnace. So when I designed this model job I conducted some experiments, with the result that my demonstration furnace has some features which I



This is the exterior of Mr. Engberg's home. The cornice, window boxes, lighting fixtures, gutters and downspouts are all examples of the contractor's ability to do quality work.

think are supported by sound theory.

"Inside the outer shell I put an inner casing. A special radiation shield, full furnace height, was curved to follow the outline of the furnace closely. As a matter of fact, there is only a relatively confined space for the air to travel



HORIZONTAL SECTION THRU FURNACE CASING

This is the way the square casing was lined, insulated and radiated

through. Between this shield and the inside casing I put insulation material. I find, now, that even when the furnace is going full open the outside casing is so cool that I can keep my hand on it.

"My reasons for designing this close fitting shield are based on ideas I have been picking up for years. I have found that in medium warm weather the movement of air through the casing is very slow when the fire is low. With this arrangement I have in my house, there is a noticeable increase in velocity even when the fire is low, and I get good circulation of air even when the plant is operating on gravity."

The construction of this insulated wall is shown in one of the sketches which accompany this story.

In addition to the casing there is another interesting feature to the furnace.

One of the illustrations shows the bonnet of the furnace. The same thing can be seen in the picture of the furnace. The bonnet slopes up from the square casing to a flat top. In place of the leaders coming out of the side of the bonnet or out of the flat top, each leader

Most warm air heating contractors live in houses heated by a furnace. Some of them have worse rattle-traps than the worst of the jobs they are trying to replace.

The furnace man has two places where he can demonstrate his merchandise and his ability—the shop and his home. In most shops heating conditions are not at all similar to conditions in a house.

Why, then, shouldn't the furnace man make his own house a laboratory and permanent demonstration in which all the points he tries to impress on the prospect can be shown in detail and explained at will.

Herman Engberg has done this and it is paying well. There's a good idea in this story.

is fitted into a flared transition which ends in a large rectangular opening. These lower openings have an area equal to the area of

the top of the furnace, and the sloping sides of the fitting guide the warm air into the leaders.

Mr. Engberg says that this arrangement is not easy to build, as it

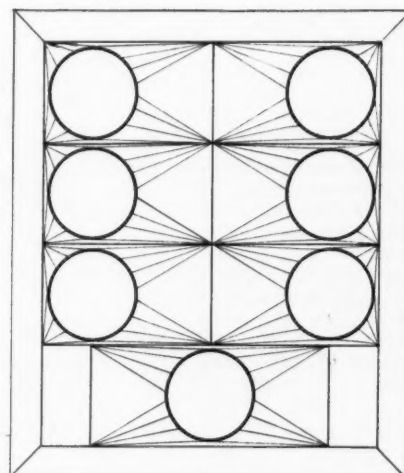


DIAGRAM OF HOOD CONNECTIONS

Special transition fittings join the round leaders to the top of the bonnet. The system works very efficiently

requires considerable layout and fitting work—BUT—it works beautifully. There seems to be almost no resistance to the movement of warmed air up through the casing and into the pipes even when the heat is down and the movement by gravity in the usual furnace would be almost negligible.



The Engberg living room. Every piece of equipment having to do with the heating system is quality material so that it can be shown any prospect

There are five large rooms on the first floor and two bedrooms on the second floor of this house. The isometric drawing shows the heating arrangement. The individual round pipe leaders come off the special bonnet and, with the exception of the living and upstairs combined run, go directly to the register.

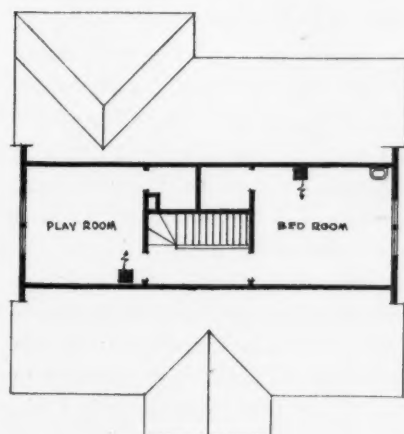
Both sidewall and floor registers were used, depending upon the conditions in the room to be heated. Two of the leaders feed double registers. At the left of the isometric drawing is one leader feeding a sidewall register in the living room and also a stack which supplies a floor register in the second floor playroom.

At the other end of the house there is two-register stack with a baseboard register for the front bedroom and a wall register for the bathroom.

The return air side of the system has three runs. One takes the air out of the living room and another from the dining room. From the front hall the air is carried down through a floor register and also through a face register placed in the riser of the stairway. This gives ample space for all the cold air coming down the stairs and in through the front door.

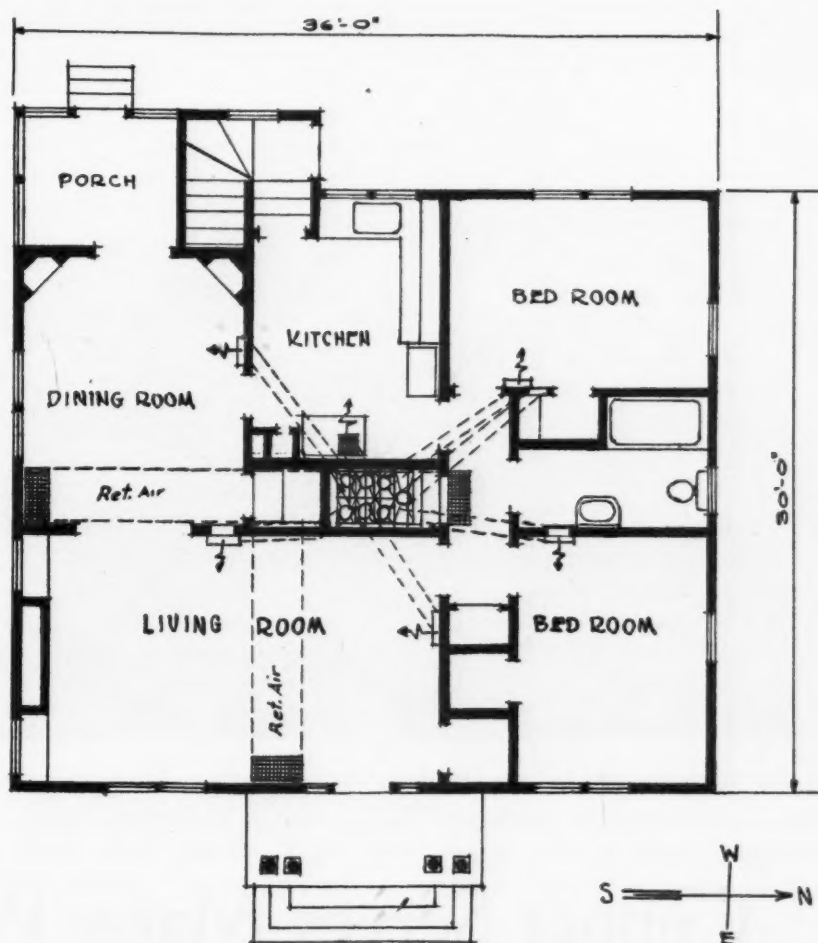
All three of these return air runs join just over the fan housing and are dropped straight down to the floor.

Some idea of the efficiency of the



SECOND FLOOR PLAN

The two rooms on the second floor are heated by individual floor registers. There is no return air



FIRST FLOOR PLAN

The first floor plan shows a compact heating system. Warm air is introduced at the nearest place above the furnace. Return air is taken out along the outside walls and the hall. Being a forced air system, positive circulation of air is insured.

installation may be gained by examining the fuel costs for last winter. The house has seven rooms, most of them pretty large. The outside of the house measures 30 by 36 feet. During the whole of last winter the house was heated with just under 1,000 gallons of oil. The oil cost 8 cents per gallon, making a cost of less than \$80 for the heating season. For a house having 10,150 cubic feet inside, this is indeed a very economical heating cost.

The oil burner is of the type (Laco) which operates on a high and low flame. Most of last winter, Mr. Engberg says, the burner operated on low. When the burner is operating on low, the fan does not run, but the plant operates by gravity. It is only when the flame goes to high that the fan comes on. The fan is a Miles with the louvers oper-

ating inside the return air housing.

Every piece of equipment used for this demonstration heating plant was selected for its particular fitness for the job it had to do.

That this demonstration has paid for itself is signified by the following statement by Mr. Engberg: "I believe that with the right kind of a heating plant any home can be heated with warm air at low cost. I believe that with such a demonstration plant available people can be convinced that real economy and satisfaction in heating lies not in getting the cheapest job possible, but the best job possible. I know that this installation has been of inestimable value to me in selling my prospects and it should prove equally valuable to every warm air heating man. It has helped me sell quality jobs at profitable prices."

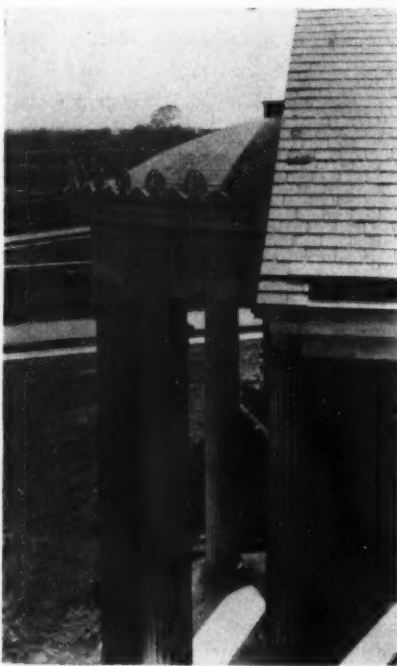


The new Shaker city hall is a handsome Colonial structure. The architectural feature is the copper clad dome which surmounts the junction of the main roof ridges

Copper Serves Many Purposes On The New Shaker City Hall, Cleveland

DURING the last few years there has been tremendous development going on around the outskirts of Cleveland, Ohio. One of the fastest growing communities is the development known as Shaker Heights. This development, while lying quite a ways beyond the residential portion of Cleveland proper, has had the advantage of rapid transit service and as a result has increased greatly in population.

During the years the development has been going on the municipal offices were housed in temporary structures. This year work was started on a new city hall building, a dignified and extensive structure designed along Colonial lines in keeping with the other business buildings of the development. The building is of crescent shape, with a long wing directly behind the center. In designing the building the



The high entrance portico is roofed with copper. Seams are flat locked and soldered

architects determined to build as permanently as possible and to insure permanency by using only materials of known lasting ability.

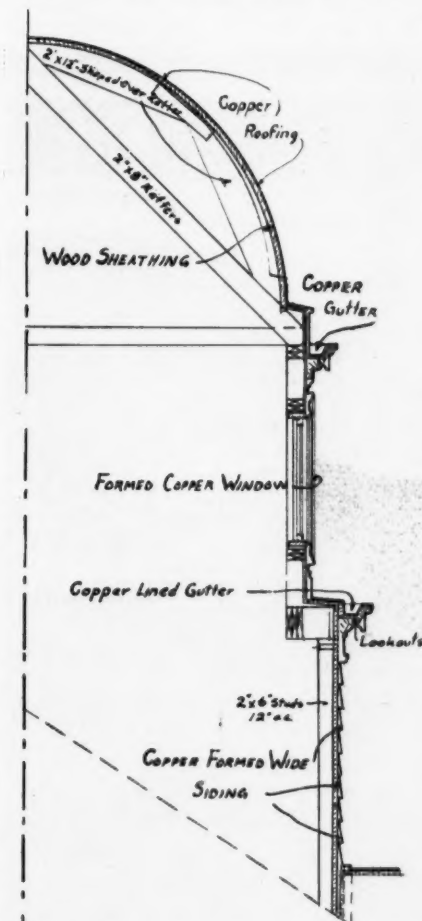
One of the principal architectural features of the building is a large dome-shaped tower which occupies the intersection of the centerlines of the main building and the wing. This dome straddles the ridge of the main roof. The base is square and the top is a circular dome without a finial. All the dome and its base are sheathed in copper.

The sheet metal contractor on this building was Wm. E. Feiten of Cleveland. The mainspring of this company is "Bill" Feiten, known to every sheet metal contractor in Ohio and to most of the old-timers, at least, throughout the Middle West and the East. "Bill" has been operating in Cleveland for many years, and this is only one of his jobs.

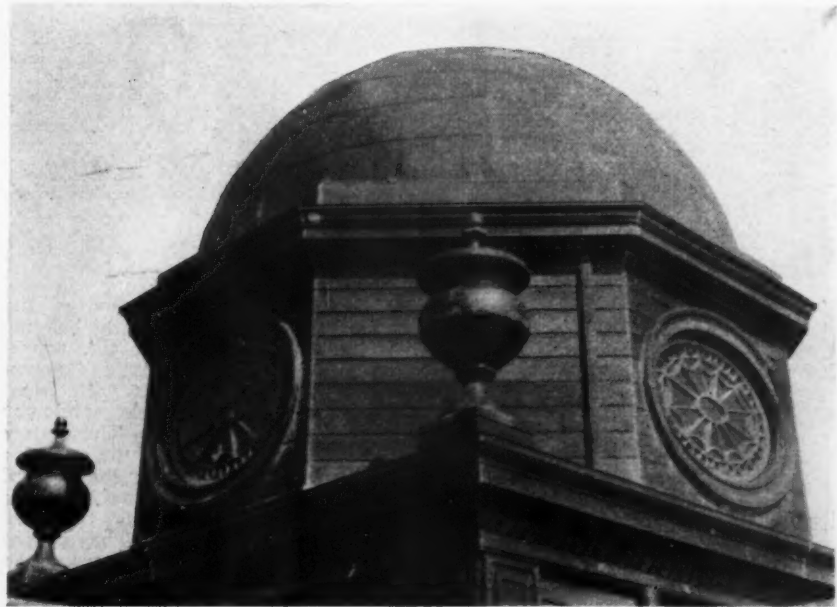
The details of the design and construction of this copper dome are interesting, inasmuch as there are several departures from usual practice in design and construction.

Beginning at the bottom, or roof line, of the dome, the square base is composed of copper lengths formed to imitate wide siding with the full lower edge thickness of the board lapped over the next lower course. These lengths are not very long, since they begin at the valley line of the roof and end at the edge of a corner pier which is formed to stand out from the wall a couple of inches. This corner panel was formed in four pieces with mitre ends. The cross section of the sections show an outer and inner square panel with depression between and throughout the center. The four sections were seamed on the under side of the panel and soldered. On this portion of the tower there are eight of these panels, all alike.

Above this part of the wall, there



A cross section of the dome. All the exterior is formed copper



The octagonal base of the dome surmounts a square base. Intricately formed copper work sheathes both these units. The dome is copper clad. The ornamentation is stampings and spun copper work

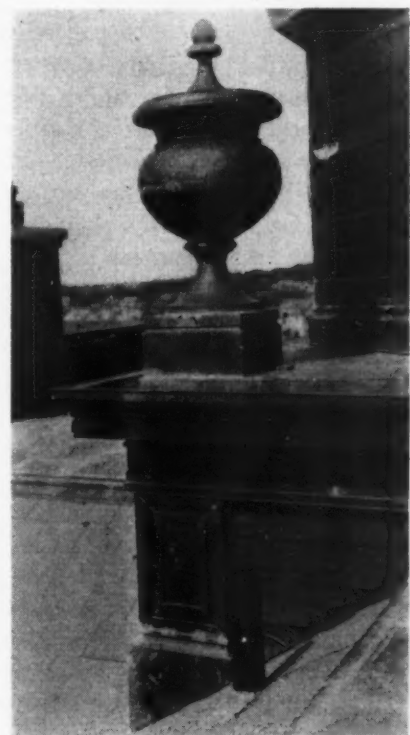
is a frieze molding of some depth. This is a stamped enrichment of standard design and is held to the cornice above and the wall below with flat locked seams, soldered.

This frieze is topped with a cornice which also holds the gutter. The cornice is of plain design without any enrichment and without any brackets. The top of the cornice is flat and level with a deck which extends back from the gutter to the base of the octagonal dome. This deck is not expected to carry any traffic, but is composed of flat locked seams, all soldered, and was built up from small sized sheets, many of which had to be cut diagonally to fit to the base of the dome.

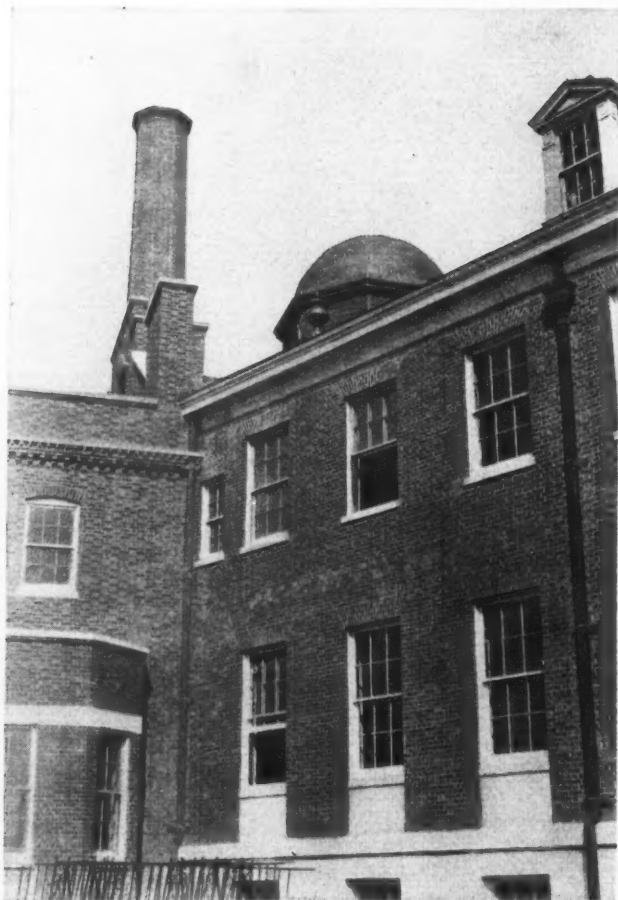
At the corners of this deck there are four sheet metal urns of rather ornate design. These stand on large bases and are braced internally for wind resistance. These are standard spun urns.

The eight-sided base is sheathed in copper formed to resemble wide siding of the top grooved type. Here the outer surfaces are flush up and down the wall, the copper being formed with a depressed panel to imitate the groove of the siding. Each of the four sides of the octagon extending up from the square base are pierced by oval win-

dows which may be opened if necessary. These oval windows have projecting rims of stamped copper. Inside the rims the glass and the pane partitions are held inside a wood frame. The frames of these windows are large and almost fill up the entire face of the tower. The



This view shows the lower cornice molding, the copper urns, the flat lower deck and the wide siding walls of copper



This view of the rear of the building shows the copper gutters and downspouts with ornamental conductor heads. The gutters are of the box type let into the slope of the roof without breaking the eave line. The copper dome shows above the roof

result is that the copper siding is in short lengths around the windows.

All the seams of this siding are soldered for water tightness.

Above the octagonal base there is a wide cornice with one crowstep above the cornice. The under side of the cornice has a row of dentils which are shallow and projected out from the lower face of the cornice. The cornice above this is plain surfaced without any enrichment. The one crowstep has no nose to relieve the plain appearance, but the covering sheet is turned down over the face of the step slightly and soldered tight.

From the crowstep the dome rises in a smooth ball. The sheets for this were all formed and cut in the contractor's shop. The sheets are rectangular in shape and are flat riveted and then soldered for water tightness. The sheets decrease in length as the rows go up the dome. The width of the sheets is, however, kept the same.

Since the circumference at each row of sheets decreases, a gore must be provided to take up the excess

The side of the octagonal base for the dome is built of copper formed to represent grooved wide siding. In alternate faces, oval copper-faced windows are cut through the wall. All the seaming on these sides was soldered for water-tightness. The cornice has an interesting dentil enrichment



metal. On this job this was done by tapering the edges of each sheet before the seam edges were added. The sheets then take up the excess metal from row to row. In the top three or four courses, of course, the gore becomes quite pronounced, especially if viewed from the top, but from the ground this is hardly noticeable.

All of the copper work of the dome was put on, of course, over heavy wood sheathing. Clipping was used at frequent intervals to make the seams permanent and prevent movement.

In addition to the copper work on the dome, there was considerable other copper work over the building. All the dormers which project out of the roof are covered with standing seam copper with a standing seam ridge. The sheets here were cut rectangular.

All the valleys and flashing work around the chimneys and end walls are of copper also. In addition,

(Continued on page 45)

OVERHEAD

**"Not So Much HOW Figured—
But Be Sure You DO Figure It"**

By PAUL R. JORDAN

MARK TWAIN once remarked that, "There is a lot of talk about the weather, but nobody seems to do anything about it." That is the way it is with overhead.

There is probably no one subject in the world of business that receives quite so much attention from the standpoint of talk, and there is probably no one element of business which receives such inadequate attention from the standpoint of action.

I offer this in the way of an apology. It is an old subject and one which has been kicked around a great deal in the past few years, but the fact remains that lack of proper figuring of overhead is almost a universal failing among those sheet metal contractors who are not making satisfactory profits out of their business.

I am going to make three statements—two facts and one opinion.

First, overhead should be figured and figured carefully. It should be included in every estimate. That is

a fact. Second, overhead should be based primarily on productive labor. That is an opinion. Third, overhead should be figured and not guessed at.

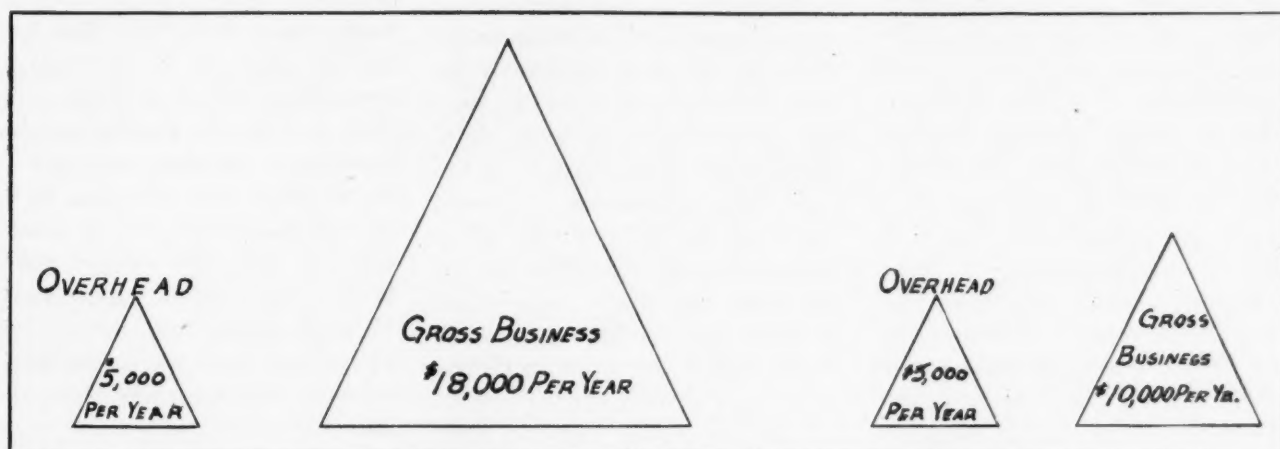
Your overhead for the current year is necessarily an estimate. This estimate should be based on the overhead of past years. Last year's overhead should be as definitely and accurately known as the amount of money you have in the bank. That is a fact.

I am only going to touch on the first of these statements at this time—overhead should be figured carefully and should be included in every estimate. It is as much a part of the contractors costs as are his labor and material. It is part of his costs in the first place because he can't do without it, and in the second place because it has got to be paid for.

I am not going to try to enumerate the various overhead items; that should be unnecessary. While there are certain items such as lost time by workmen, mistakes, collection

losses and expenses, estimating time, etc., which are too often ignored or at least slighted, these items will all be brought to light by a proper system of figuring overhead. I am going to be satisfied for the present with stating that they should all be figured and figured accurately.

It is a recognized fact that because overhead carries a number of fixed items, such as rent, insurance, office salaries, etc., the percentage of overhead goes up when the volume of business is small and goes down when the volume of business is large. That means that overhead is highest when business is worst and is lowest when business is best. This naturally offers the paradox that we should get the highest prices when business is worst and the lowest prices when business is best. Of course the fact is that we get the highest prices when business is best and do the most cutting when busi-



There is one thing about Overhead. That is that whether business is good or bad Overhead remains practically the same. This being so, the percentage of Overhead goes up when business is BAD and goes down when business is GOOD. You should, then, get the BEST prices when business is BAD. Do you?

ness is worst.

There is no economic justification for the lowering of prices during periods of depression, unless these periods of depression bring with them a lowering of wage scales and material costs. The excuse of the contractor for price cutting is necessity. This is usually just an excuse. It is certain that if the trade as a whole maintained prices in the face of low volume, fair prices could be

for all the time he spends, and have any profit left. If he did that, the fellows who work ten and twelve hours erecting, estimating, selling, etc., would all have substantial bank accounts; and if they had substantial bank accounts they would not be so desperate for work when business gets slack.

Every business man is entitled to pay for each hour he spends in his business on the same basis as though

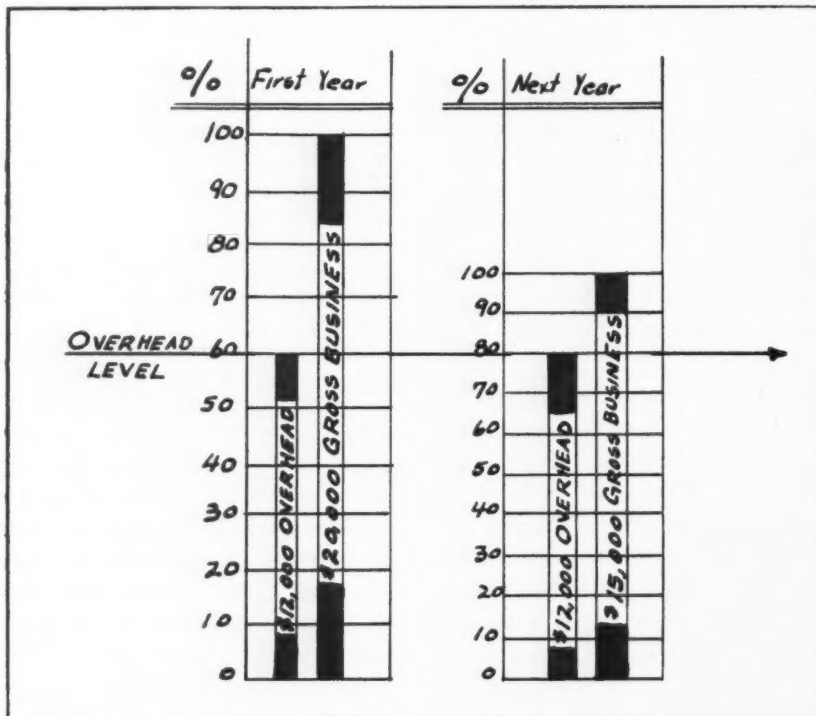
that he should either take it out of the business or leave it in. Then if he has not taken that amount of money out of his business, that amount of money should show in his inventory and statement of assets as an increase in his business assets. Granting there are good years and bad ones, good years should offset the bad ones and the average should be there.

I have mentioned basing overhead on last year's business. I do not mean to put this forward as an absolute rule, but at least it has some things to recommend it. Of course I have no criticism against the contractor who figures his overhead every month, and who revises his estimate for overhead monthly. The yearly estimate however takes in a complete cycle of seasons, with its varying conditions, both in expenses and in production.

In basing overhead for estimating purposes on the past year, the contractor is giving varying conditions a chance to equalize themselves, without hanging too heavy a penalty on the lean year, at the same time distributing the load. Let's us see how this will work out.

Suppose a contractor during a good year has productive labor of \$20,000 and overhead of \$12,000. His overhead then is 60 per cent on productive labor. Now suppose the next year, his productive labor drops to \$15,000. His overhead percentage leaps up to 80 per cent on productive labor, if his actual overhead remains at \$12,000. But during this lean year he continues to figure his overhead at 60 per cent. Now the following year he bases his overhead on the lean year figure of 80 per cent. If it turns out to be another lean year, he is only breaking even—doing the necessary thing in the way of estimating overhead. If, on the other hand, it turns out to be a good year—as is most likely; he makes up for his loss during the lean year.

You will note that I have said "If" his actual overhead remains at \$12,000. If it does remain at that



This graph shows how Overhead jumps in proportion to gross business as business falls off. If you estimate your percentage of Overhead on ONLY the preceding year, you are likely to have too large or too small a percentage for Overhead. Estimate your Overhead on the basis of FIVE previous years

obtained as easily as low prices. Price cutting is based on greed, and the funny part of it is that the greed reacts against the greedy one. If he had maintained prices he would be surprised to find that he would still get a fair share of business and that he would actually make more money than he does by price cutting.

In talking about price cutting I am not changing the subject. I am still talking about overhead. The average sheet metal contractor who cuts prices is not subtracting from his profits. He never had any profits in the first place. He is cutting in on his overhead. The average sheet metal contractor does not pay himself rent for his shop, and wages

he were working for someone else. He is also entitled to expenses, such as automobile and trucking and like expenditures. He is also entitled to rent and telephone charges if he owns his shop or if he uses his residence telephone for business. He is also entitled to depreciation on his equipment, to interest on every penny he has invested; and when he has all of this figured he has not yet made any money. In addition to these he is entitled to an estimated 10 per cent profit on his entire volume of business.

I am not saying that the sheet metal contractor should necessarily take this amount of money out of his business. What I am saying is

This discussion on Overhead is arousing lots of comment. It should—for every business man is vitally interested in it. Paul R. Jordan is known to many of us as a first class business man. For years he has studied and investigated and figured Overhead. The result of this study is embodied in this series of articles. This article contains some bold statements. Do you agree with him?

figure, that contractor is pretty dumb; but on the other hand, he must not kid himself that he can cut down his actual overhead by a very great percentage, because he can't, at least not without destroying his organization. About the safest cut he can make is in his own salary.

The ability of a contractor to estimate high enough in lean times depends to some extent on his competitors, but not to anything like the extent that most contractors believe. I have known many contractors to start figuring sanely, and to be surprised at the work they got. One contractor said to me awhile back, "I am losing more business and making more money than I ever did before in my life."

Volume is not built on low prices, it is built on good work. Look around and you will find that the biggest contractors get the best prices. And the converse is true—the fellows who charge the most (and deliver quality to match) get the most business. The customer fools you by yelping a lot about price, but he does not buy on price nevertheless.

If the trade in any community

holds up its prices, not to an artificially high level, but to a decent level (above the artificially low level at which a business cannot

permanently exist), then what happens? Most of the work which would go ahead at a lower price,
(Continued on page 43)

H. A. Daniel Backs Dingle

THIS argument about how and where to apply Overhead is stirring up a lot of interest. And by no means do we find that contractors are agreed on which method is best. Evidently hundreds of contractors have tried first one method and then another and in the end have adopted the method which fits in best with their particular requirements.

Joseph D. Dingle, in his opening gun in the debate, said that taken by and large, Overhead is easier and more accurate when applied to *both* Labor and Materials. Here is a letter from a contractor who thinks Mr. Dingle is right and tells how his experiences have proved the point to his satisfaction.

American Artisan,
139 N. Clark Street,
Chicago, Ill.

Dear Sir:

I was very glad to note Mr. Dingle's statement in the September 27th issue of the AMERICAN ARTISAN to the effect that overhead should be applied on labor and materials.

This has been our method.

It has seemed to us that carrying along about the same kind of business from year to year this would be more accurate than to figure the overhead on the productive pay roll.

One of the reasons for this is that to figure the overhead on the productive pay roll is considerably more complicated than to figure it on the total volume of business.

It would mean that the pay roll would have to be separated into productive and non-productive elements.

And then this would make it necessary to figure another rate of overhead for merchandise sold and then when figuring jobs if the overhead has to be added on the labor cost the overhead in that case is figured on the most uncertain element as it is far more difficult to figure the labor cost than the cost of materials.

For that reason overhead based on the estimated labor cost is much less accurate than overhead based on the

total cost of the job.

Perhaps 90 per cent of the shops throughout the country would find it too complicated to figure the overhead on productive labor.

Perhaps 50 per cent or more of the jobs throughout the country do not figure overhead at the present time, even by the simplest method.

And then if overhead is attached to the labor item how would it be possible for the owner of the business to get any jobs at all where a considerable amount of labor and not much material is involved?

If he pays a man \$10 per day and has to add 100 per cent on his productive pay roll to cover the cost he would have to charge about \$3.00 per hour for labor in order to get any profit at all, and of course, nobody would knowingly pay \$3.00 per hour for labor.

When 60 per cent is added to the wages paid it will usually return a profit of about 10c per hour net on the labor and even then owners kick like the deuce as they know the wages paid mechanics and think that the difference between the wages paid and the charge per hour is profit to the owner.

If the charge on the labor were made on the basis of the overhead being attached to the labor the legitimate shop would get little, if any, business on a day's work basis.

The simpler and the more accurate we can get the basis on which overhead is figured the greater will be the number of people using a system of cost keeping.

As the system of figuring overhead on the entire volume of business is much less complicated than a system which requires figuring it on a basis of productive labor it is much more likely to be accurate, therefore, in my opinion, it is the best system for the average shop to use.

The other system may be better for large shops having competent cost keeping experts, but in my opinion it does not fit into the scheme of things for the average shop and I was very glad to see Mr. Dingle's recommendation that overhead should be applied on labor and materials.

I am.

Very respectfully,
(Signed) H. A. DANIEL.

A NEW GAS FURNACE IN AN

ONE of the most interesting warm air heating installations completed this year in the vicinity of Toledo, Ohio, is the new gas furnace plant designed and installed by Herbert H. Sloan, heating engineer, of Toledo.

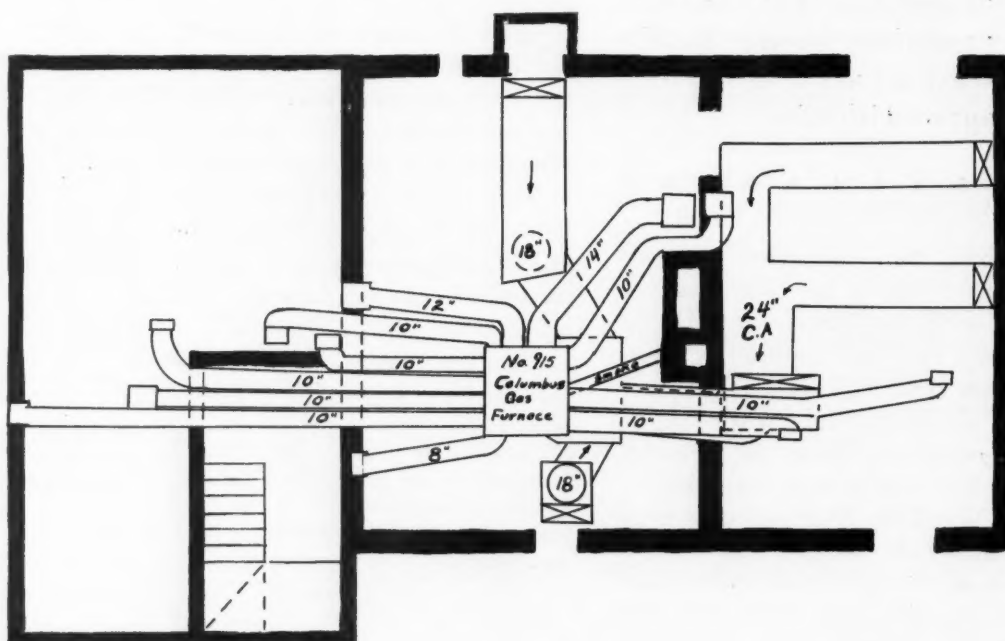
This furnace was installed in the house of Mrs. Thomas H. Tracey, Jr., whose home is situated on the "River Road" some distance out-

whatever up through these walls the stacks had to be placed as much out of the way as possible and the lathing and plaster torn out and built out around the stacks. In some places the line of the entire wall was moved out even with the stacking so as to give a flat surfaced wall. All the stacking used is of the double wall type. Although this was a difficult job, there was no

tem is the few warm air outlets in the large downstairs rooms and the very complete return air system for these same rooms. By using a design of this kind much heavy cutting for stacks and registers was eliminated.

The house has a heat loss of approximately 113,000 B.t.u. The furnace has a capacity of 147,000 B.t.u. or considerably more than

The foundation walls of this old house were several feet thick in places. Cutting through for the pipes was a tedious job. In spite of the house's large size the system is compact. One of the features is the way the leaders were bunched. The compactness of the layout made it possible to operate the system by gravity



side the city of Toledo. The house stands on the bank of the Maumee River and is exposed on all sides. The house is many years old and is constructed of huge, thick basement and foundation walls with large, rough-hewn floor joists. These thick walls and heavy joists necessitated much difficult and tedious cutting to get the pipes and ducts through the basement.

As the house stood when the heating engineer began work, there was no stacking in the walls. The job of stacking was made more difficult by the fact that many of the walls were only 3 inches thick. In order to carry any sort of stacking

other way out of the problem.

The house is long and large, yet the heating plant was so carefully designed that the plant is as compact as many installations in smaller houses.

The system designed uses round pipes for all the basement leaders and flat return air ducts. The system is a gravity plant with all the return air dumped into one large rectangular housing back of the furnace. The furnace is a number 915 Columbus gas furnace with an automatic humidifier and complete automatic thermostatic control governing the burner.

One of the features of the sys-

tem is the few warm air outlets in the large downstairs rooms and the very complete return air system for these same rooms. By using a design of this kind much heavy cutting for stacks and registers was eliminated.

From the top of the square casing 11 round, bright tin leaders are taken. As many of these leads as possible were ended at the heavy basement partition walls to eliminate cutting through the wall. It was not possible to end all the leaders here, however, so several continue through the walls.

The sizes of these warm air lead-

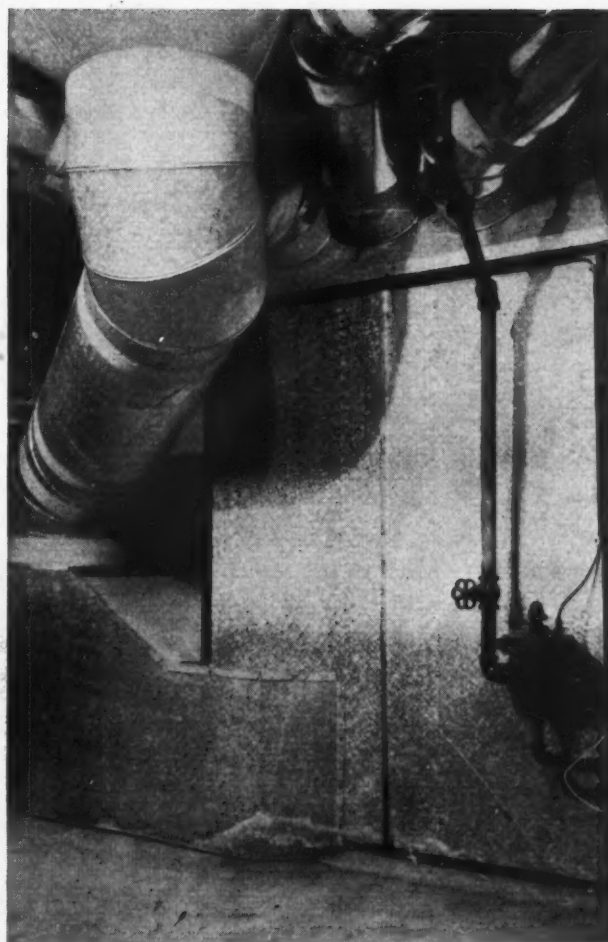
OLD HOUSE

W. Herbert Sloan, the engineer for this system, specializes in installations for the larger type of house. He engineers each system to the particular house. Since Toledo is now on a natural gas pipe line, gas furnaces are becoming popular. They provide automatic heating at very economical cost.

ers are given on the heating plan layout.

The return air side of the system is especially interesting. From the large living room which occupies the entire width of the center of the house and from the library and hall at the end, four registers empty into three return air ducts. From the library two floor grilles located under the windows are carried between the joists to the partition wall just back of the furnace. Here they join with a third duct coming down from the front hall and the three are dumped into the return air box through one large rectangular duct.

This is one side of the gas furnace. The large pipe in the foreground is the return air from one side of the living room. The warm air leaders are bright tin, without wrapping, except at joints. The furnace is housed in a square casing of unpainted galvanized iron.



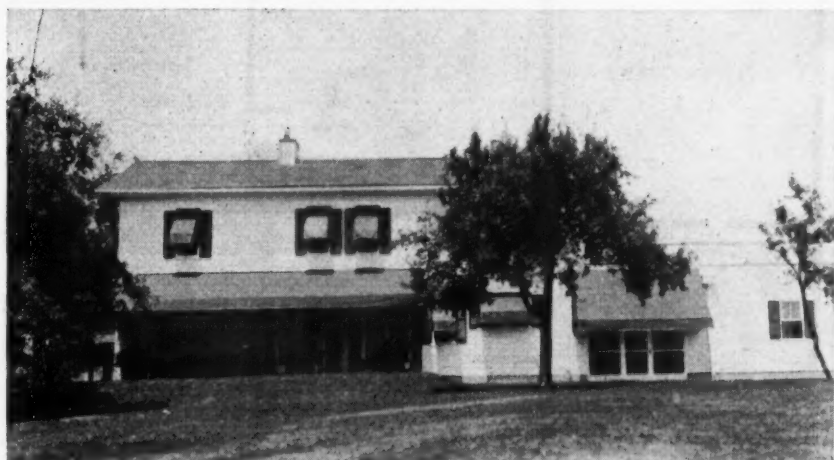
The two return airs from the sides of the living room are carried to the return air box through separate ducts running across the joists. No return air is taken from the service end of the first floor or from the second floor. The second floor is rather open and compact and Mr. Sloan figured that this floor could be heated by depending

on the front and back stair wells to bring return air downstairs.

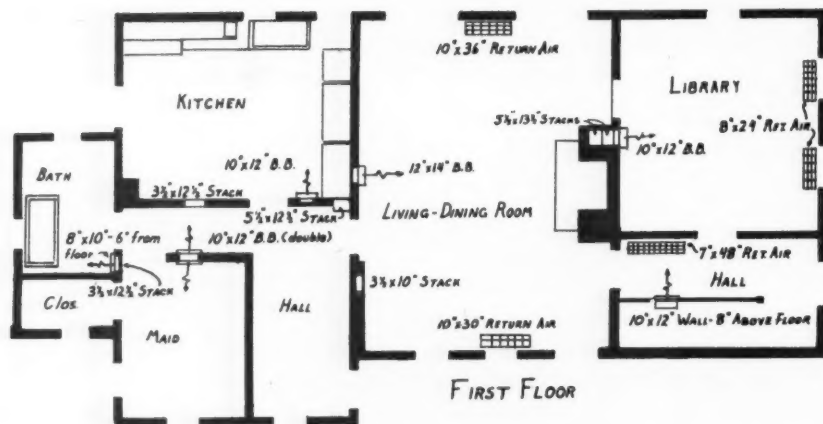
The joists through which the return air is carried are rough, but were not lined. In some places the joists are not particularly deep, but both roughness and depth were compensated for by using several spaces for each duct. Through some weeks of operation, it has been found that the system works nicely.

The first floor register and grille layout shows several features of interest. On the first floor all the registers are of the baseboard type excepting two, the maid's bath at the rear having a wall register 6½ feet above the floor and the front hall where the register is 8 inches above the floor.

The back hall and the maid's bedroom are heated through a double headed register which is supplied by a 10-inch leader. Beside the living room fireplace there is another interesting piece of construction. In-



The house stands on the bank of the Maumee River. It is exposed on all sides and has long, high walls with lots of large windows



The return air system from the first floor is concentrated in the living end of the house. One warm air register, only, is used to heat each room.

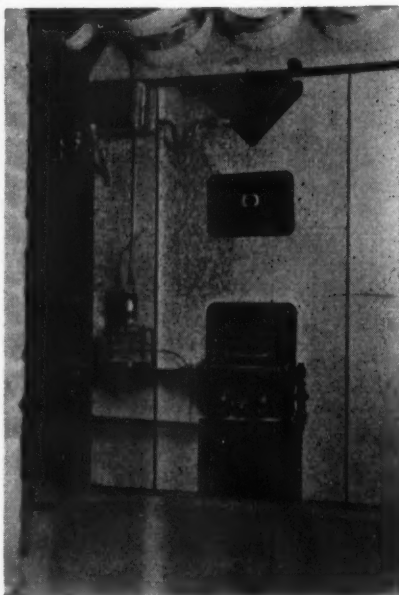
side the brickwork two $5\frac{1}{2}$ by $13\frac{1}{2}$ -inch stacks are taken to the second floor. One 14-inch leader supplies these. In the same cavity there is 10 by 12-inch baseboard register boot feeding off a separate 10-inch leader. All the other warm air outlets on the first floor are of customary construction.

On the second floor there are three bedrooms, a sleeping porch and two baths. The large master bedroom and the room adjoining are heated off the double stack which rises alongside the fireplace and furnace chimney. The small front bath is supplied by a $3\frac{1}{2}$ by 10-inch stack which is taken up through a partition.

The second bath is heated from a wall register supplied by a $3\frac{1}{2}$ by 10-inch stack and an 8-inch leader. The maid's room is heated through a floor offset from a $3\frac{1}{2}$ by $12\frac{1}{2}$ -inch stack and a 10-inch leader. The sleeping porch is heated by a large floor register, the only one on the second floor. All the registers on the second floor open from the walls and are placed 18 inches above the floor level.

Two sets of controls are used with the furnace. An upstairs thermostat starts and stops the burner according to the temperature of the house. A bonnet control prevents the furnace from overheating. Since this is a gravity system air movement depends upon the heating of the air within the casing.

Each warm air pipe has a manual damper located close to the furnace.



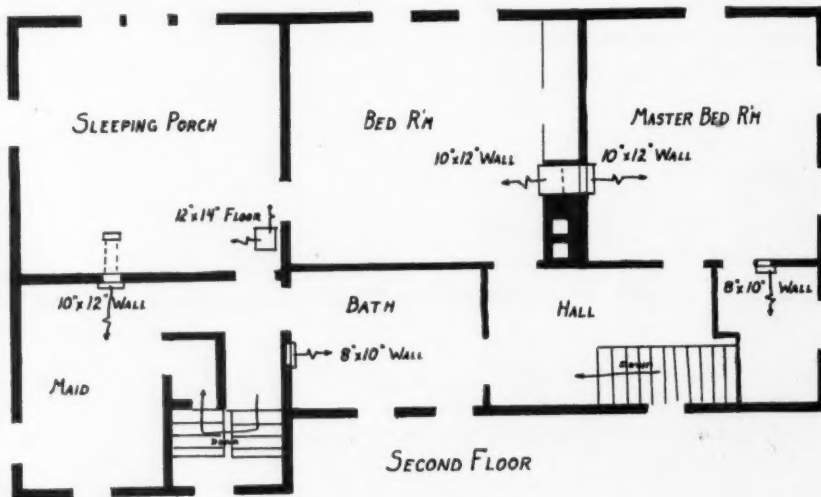
The front of the furnace. The humidifier is above the burner and is automatic in operation. No attention is necessary other than turning on the gas in the spring

The system was balanced with these dampers and rooms requiring extra heat were tempered by adjusting these dampers.

The plant was in operation during the early spring of this year. In spite of cold weather and windy conditions every room was adequately heated. The plant proved most convenient later in the spring when warm days requiring no heat were followed by cold nights when heat was desirable. Under these conditions an automatic plant of this type supplied the owner's desire for a plant which needed no attention, but operated at the dictates of the temperature within the house.

This interesting job is only one of several large plants designed and installed according to plans prepared by Mr. Sloan. Most of these installations use a gas furnace since Toledo's supply of natural gas makes possible economical operation without requiring any attention from the owner.

The cost of operating these gas furnaces on natural gas compares favorably with the heating cost using the cheapest fuel available. There is in addition, the saving of any janitor or ash man service and in a home where most of the furnace tending must be done by servants or the lady of the house the elimination of any attention is one of the strongest points for gas.



No return air is taken from the second floor. However, there are two open stair wells which provide good travel down to the first floor. One warm air register to a room is provided.

Layout for a Range Hood

For Eugene Dodd, Bessemer, Alabama

By **W. R. HAINES**
Contributing Editor

THE sketch submitted for development by a subscriber in Bessemer, Alabama, is a typical range hood used quite generally by the trade. I will endeavor to show in a simple manner as possible how to develop this hood. In the first place, there are three things in triangulation to remember; first, your base line; next, your straight height, and third, your true length, which last is nothing more than the hypotenuse of the right-angled triangle.

In this problem, the first step is to make your plan, which is 43x30 inches with a 7-inch collar or outlet for fumes. The next step is your elevation, which I am showing on

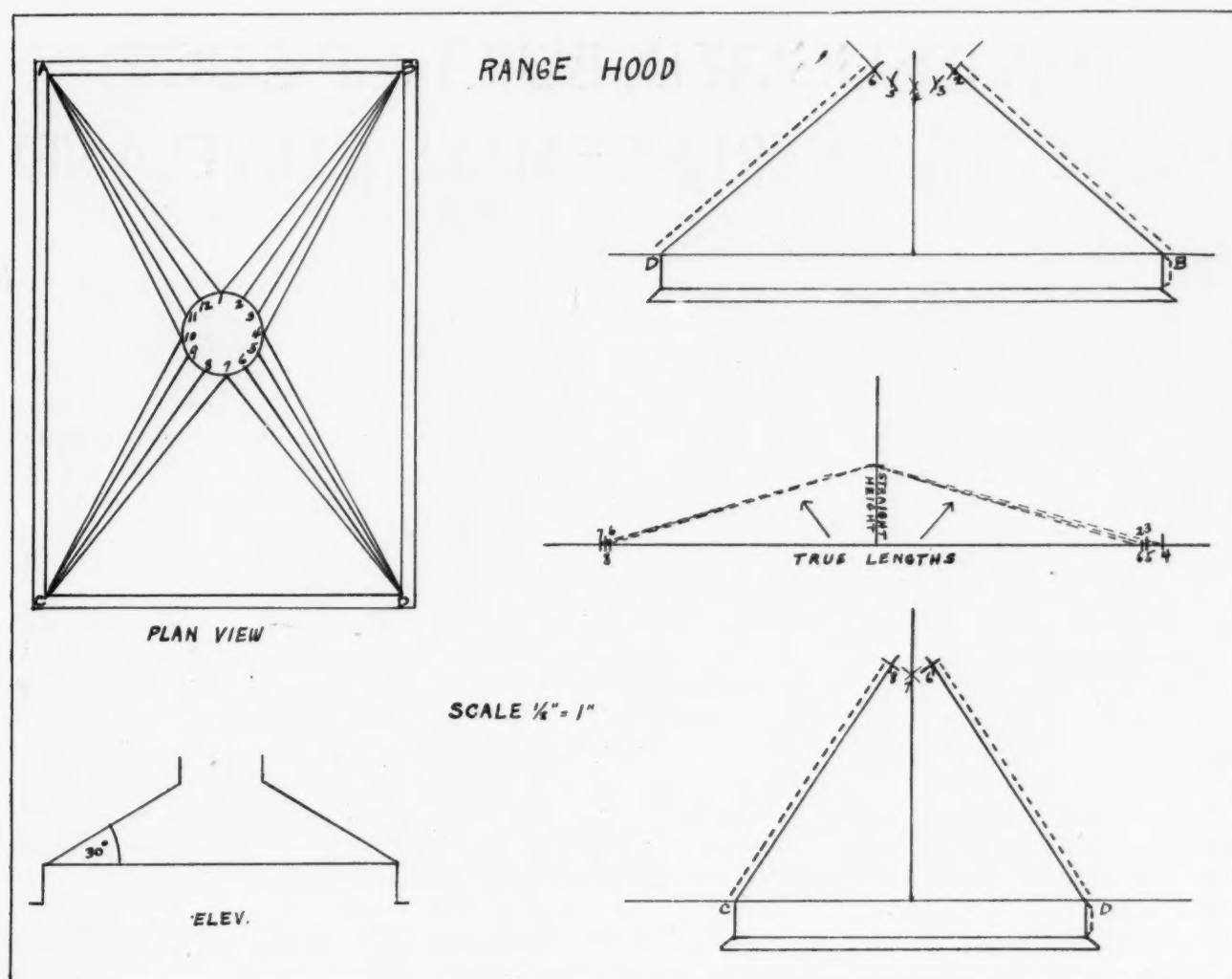
the narrow side to save space. I take from the subscriber's sketch that the side of his hood is three inches straight down with a one-inch flange. So am showing same that way. The elevation of this hood is made on a 30 deg. rise, or commonly known to the trade as 1/3 pitch. This can be computed on the steel square by using the figures 12 inches horizontal 8 inches vertical, which will give you an approximate 30 deg. angle.

On the elevation, measure in from your outside edge 11½ inches, and square up to your slant height,

which will give you the straight height. You are now ready to take the true lengths from your plan, which sums up what I just said—the hypotenuse of the right-angled triangle is what you are after.

I have located the seams on your four corners, which saves material and also eliminates any seams in the mould of your hood. I think when you get your hood made you will agree with me. You can use rivets or a standing seam construction as you desire.

From the base line and straight height line as shown, together with the plan view, we find all our true lengths. I always use two pairs
(Continued on page 43)





The 20-year bonded roof was laid over an insulating layer of 1½-inch cork. The cork in the foreground has been given one mopping, but will receive another when the felt is laid. The lap of the felt is 2 feet over the row next below

THIS INSULATED, BUILT-UP ROOF PROTECTS SEVERENCE HALL, CLEVELAND

THERE is nearing completion in Cleveland, one of the finest buildings of its kind in the country—Severence Hall. This imposing structure will be the home of music in Cleveland and into its construction is being incorporated every feature to make the handsome building as permanent as possible.

No expense is being spared to make the building beautiful and this beauty of design and furnishing is being protected from the action of the elements by every known device of the construction and engineering professions.

In this program of protection, the roof of the building is especially worthy of study. It is an extra heavy roof, of the best design available and constructed under constant supervision of the architect's representative.

There are two distinct parts to

the roof. The upper part is sloped and ends in an octagonal tower. Alongside this upper portion are two large flat areas which must be protected from water penetration, as this flat roof covers many important executive offices and rooms within the building. This flat roof is a 20-year bonded roof.

The supporting surface for the roof is a concrete slab resting on the structural members of the building. This concrete slab is of the continuous type and extends from the inside walls to the cornice on the outside.

The concrete was given one mopping and then covered with one-ply liner of felt. This felt was then mopped again and a layer of 1½-inch cork insulation laid all over the roof. The cork used was in small sections to facilitate handling and to allow placing the cork right after

the mopping.

The surface of the cork was then given another mopping and the 20-year bonded roof was then laid down. This bonded roof consists of four plies of tarred felt, lapping each sheet two feet over the preceding one. Each layer was mopped over the full two feet so that the upper layer of felt did not touch the next lower at any point.

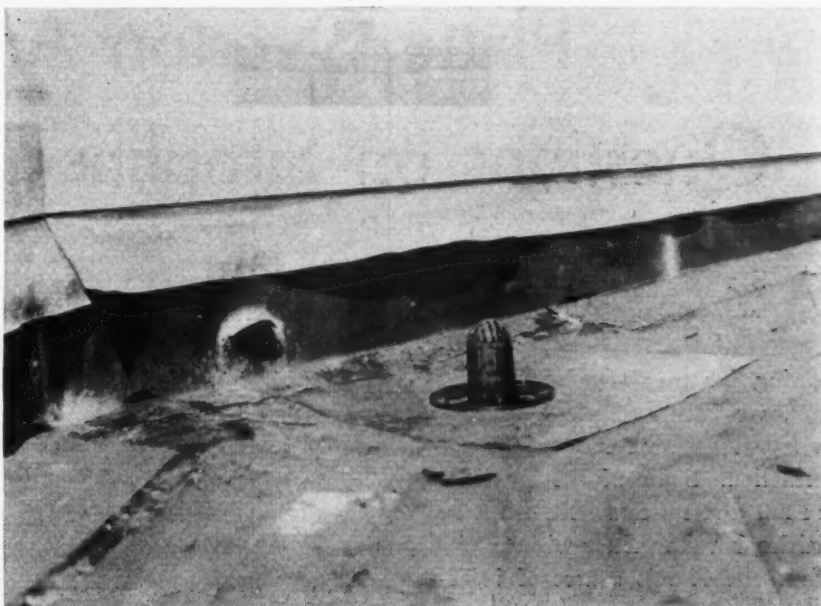
Over the four plies of felt pitch was mopped hot and a combination of 400 pounds of gravel and 300 pounds of slag was embedded over every 100 square feet of the roof. Since this roof will probably carry some traffic it was felt that a heavy roof was required.

As can be seen in some of the pictures the higher part of the roof runs across the flat roof at an angle. The roofing material and the insulating material were both laid at

right angles to the outside building line. This meant that where the roofing material came up against the wall every row of material had to be cut diagonally. Moisture protection was insured by flashing up the felt and mopping.

In handling the roofing work the kettles were erected on the roof and materials raised by windlass from the ground. The pitch was carried in buckets.

One of the interesting details of the work was the increased protection built into the drains. A lead sheet $2\frac{1}{2}$ feet square was fitted down into the basin of the drain. The insulation and the roofing material were carried up to the circumference of the drain. The lead sheet was then placed over this and worked down inside the rings and sealed. The sealing ring was then placed and the upper portion of the roofing carried over the lead sheet.



This is a closeup of a drain. The large sheet around the casting is lead. This lead sheet was worked down into the drain pit and the ring pulled down tight. Water must back up level with the roof before water can penetrate the roof

Water cannot leak out of this drain without backing up to a level higher than the level of the roof proper.

The contractor for this job was the Lee H. Gould Company of Cleveland.



The supporting roof is a concrete slab. The slab was mopped once, then a layer of felt was laid and this was mopped. The cork was laid in this second mopping. Short, diagonal end pieces had to be used against the wall in the foreground

Platte Overton Answers

Questions on Simplified Engineering

AS a result of our announcement of articles by Platte Overton on simplified engineering for the warm air heating man, we have received a number of letters asking for additional information. Some of the questions are not directly connected with the articles, but the writers wish to take advantage of this source of information.

Efficiency of Four Types of Elbows

The following is a typical letter asking us to settle a problem:

AMERICAN ARTISAN.

Gentlemen:

To settle an argument with our building inspector I am submitting to you drawings of wall pipe or furnace pipe—each drawing showing a different arrangement of the angle or head in the pipe. I would like to have you give me some advice on these figures.

I have maintained that there is nothing gained in capacity or efficiency in Figure 2 over Figure 1. Now I would like to know if there is any capacity or efficiency gained through arrangement as in Figure 3 over Figure 1 or 2. Is anything gained in Figure 4 over Figure 1 or 2, particularly Figure 1 with the same pipe areas?

Yours very truly,

(Signed) J. G. Strawn,
Oakland, California.

In reply to this interesting question Mr. Overton replies as follows:

The pressure loss occasioned by elbows is generally stated as a function of the velocity head, and we determine this loss in inches of water by multiplying a coefficient

determined by experiment by the velocity pressure (V. P.).

The approximate coefficient is given at the right of the drawing of each elbow.

As no areas are given and no velocities determined we will assume that the question asked has been answered as the request was for approximate gain in Figure 4 over Figure 1.

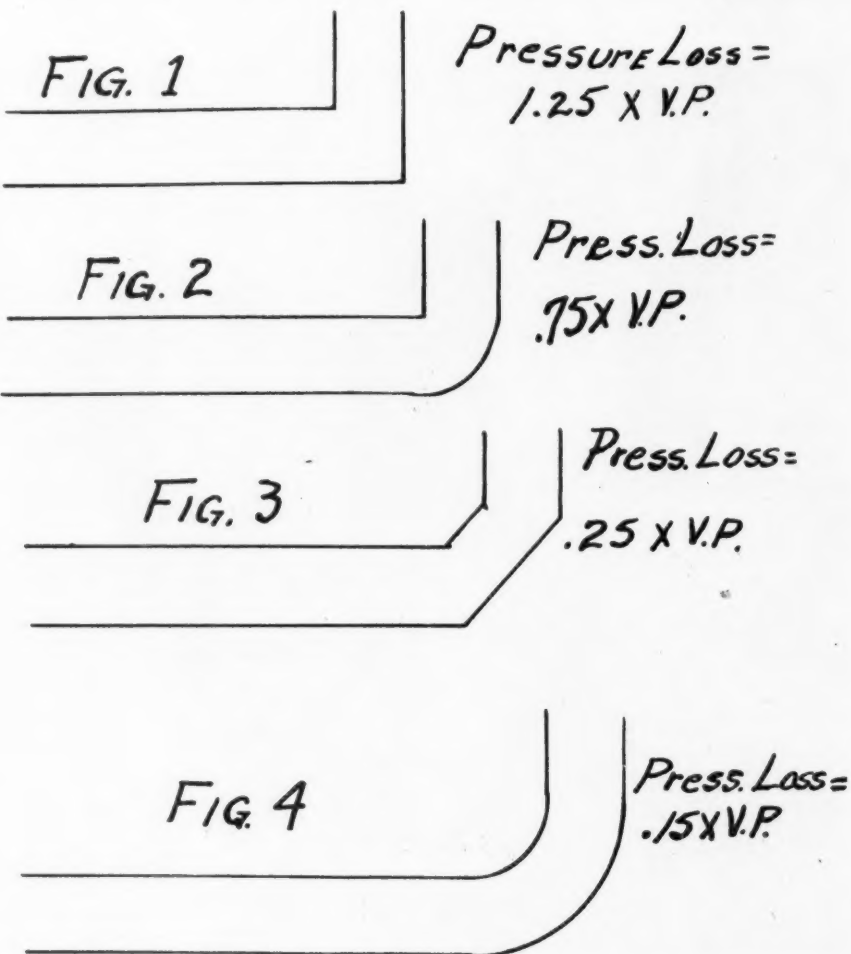
The coefficient of .15 for Figure 4 in comparison to the coefficient of 1.25 for Figure 1 tells the story. The writer is particularly averse to "trained arrows," but those shown in the following sketches give some

idea of the resistance occurring in the above elbows.

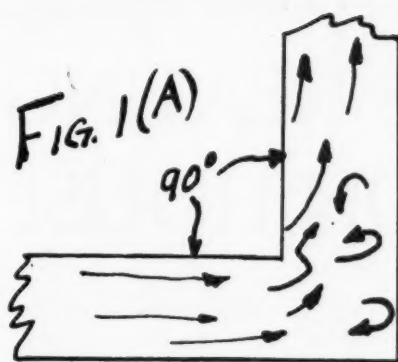
Figure 1 (A) gives an example of the worst possible condition for an elbow with a 90 deg. turn. This is for a rectangular duct. Figure 1 (B) if for a round duct and the coefficient is given as $.85 \times V.P.$ proving that less pressure loss would be experienced in the same elbow if the duct were round.

Where elbows with inside square throats (Figure 2) are unavoidable, as they sometimes are, they may be improved by the installation of a deflector as shown in Figure 2 (B).

Figure 3 is shown as a 90 deg.



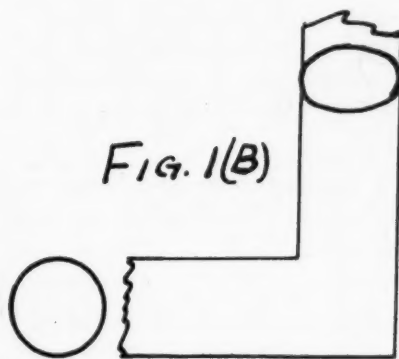
Here are the four turns under discussion. Alongside, Mr. Overton has listed the coefficients. The proportions of these coefficients may be taken as an indication of the efficiency of the turns. The lowest coefficient denotes the most efficient turn



This is the worst possible condition. The turn is 90 degrees in a rectangular duct. (Fig. 1A.) Where this condition is unavoidable, make the outside of the elbow round (Fig. 2A). This increases the efficiency approximately 60 per cent

turn with two 45 deg. elbows. The writer sees no excuse for the use of such a fitting as the two 45 deg. elbows would allow the necessary space to install an elbow as shown in Figure 4.

Here is Figure 4 we have the ideal and in no case should the throat be less than 12 inches and if



The same 90 degree turn in round pipe is 68 per cent more efficient than a 90 degree turn in a rectangular duct

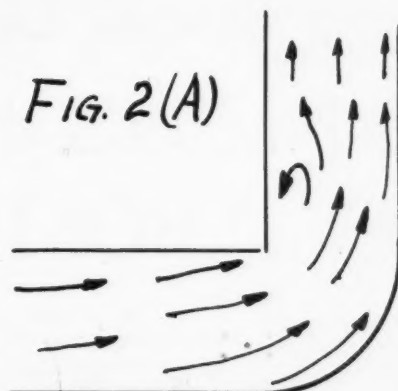
possible should be the width of the duct.

A_1 = not less than 12 inches.

A_1 = to A_2 if possible for good practice.

A_1 may be less for small ducts such as stacks in house heating but here follow the rule of $A_1 = A_2$.

A rule of thumb method of figuring the loss inducts where the above rule is used for the construction in elbows is to allow 10 feet of length for each elbow. Hence, if we have 50 feet of duct and 5 elbows we have the equivalent length of 100 feet of straight pipe.



How to Figure Grate Area

HERE is another interesting letter asking for some information about grate areas.

AMERICAN ARTISAN.

Gentlemen:

I would very much like to have the following information.

How would you determine in inches the amount of fire pot or square feet of grate area required for a house after you have determined the area of the basement leader pipe?

As an example—if the combined area of the basement leaders is 396 square inches would the house require a 20- 22- 24-inch fire pot. Also how many square feet of grate area are required and how do you figure this?

I do not quite understand this part of the Standard Code.

Yours truly,

A Reader.

This, says Mr. Overton, is one of the fundamental principles every

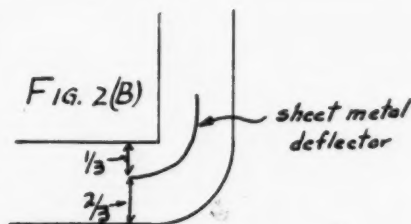
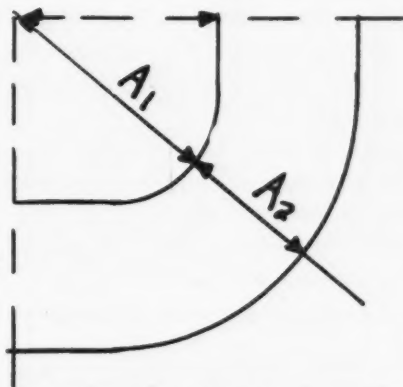


Figure 2A can be made more efficient by installing a sheet deflector placed according to this diagram

warm air furnace man ought to thoroughly understand. In reply to the question he says:

Regarding your letter of Aug. 7/30 relative to grate size for furnace with 396 sq. in. of pipe area. The Standard Code gives the equation, $A = 1.75 G [1 + 0.02 (R - 20)]$ for determining the necessary grate surface where the sq. in. of pipe are equal to A , and G is equal to the grate area in sq. in.

The above formula is given for the ratings of a furnace but not for the estimating of grate surface required. Hence we must estimate "G" before we work out the formula. If we give "G" as 255 sq. in. or a fire pot 18 in. in diameter we



This is the ideal 90 degrees turn. The throat (A_1) should be NOT less than 12 inches and if possible in large ducts equal in radius to the width or diameter of the duct

have $A = 1.75 \times 255 \times [(1 + 0.02 \times (20 - 20))] = 453$ sq. in. of pipe area.

R (20 in this case we presume) = Ratio of heating surface to grate surface for any furnace. As this 453 seems high in relation to 396 sq. in. required we find that a grate 17 in. in diameter equals $1.75 \times 225 \times [1 + 0.02 \times (20 - 20)] = 402$ sq. in. pipe area approximately.

As we assume that a furnace with a 17-in. grate will have a fire pot diameter at the top of 20 in., we would choose a 20-in. furnace for 396 sq. in. of pipe area.

However, it is in all cases the best policy to determine the required heater by grate surface rather than fire pot diameter as they vary on all makes of heaters.

A New Furnace, Blower, Automatic Control Are

MODERNIZING the HEATING Of An OLD BOSTON HOUSE

ONE of the things which makes life interesting for the eastern seaboard warm air heating contractor is the replacement work in the large houses built by past generations. These old homes are found in every community. Many of them are more than one hundred years old. Most of them were built in the days when large houses, with many rooms and high ceilings were the sign of architectural perfection and community standing.

When these houses were built, heating them was indeed a problem. Of course the folks who built and owned them had warm air furnaces. As a matter of fact, the warm air furnace was the most advanced of

any type of heating and was the type first considered by the home owner.

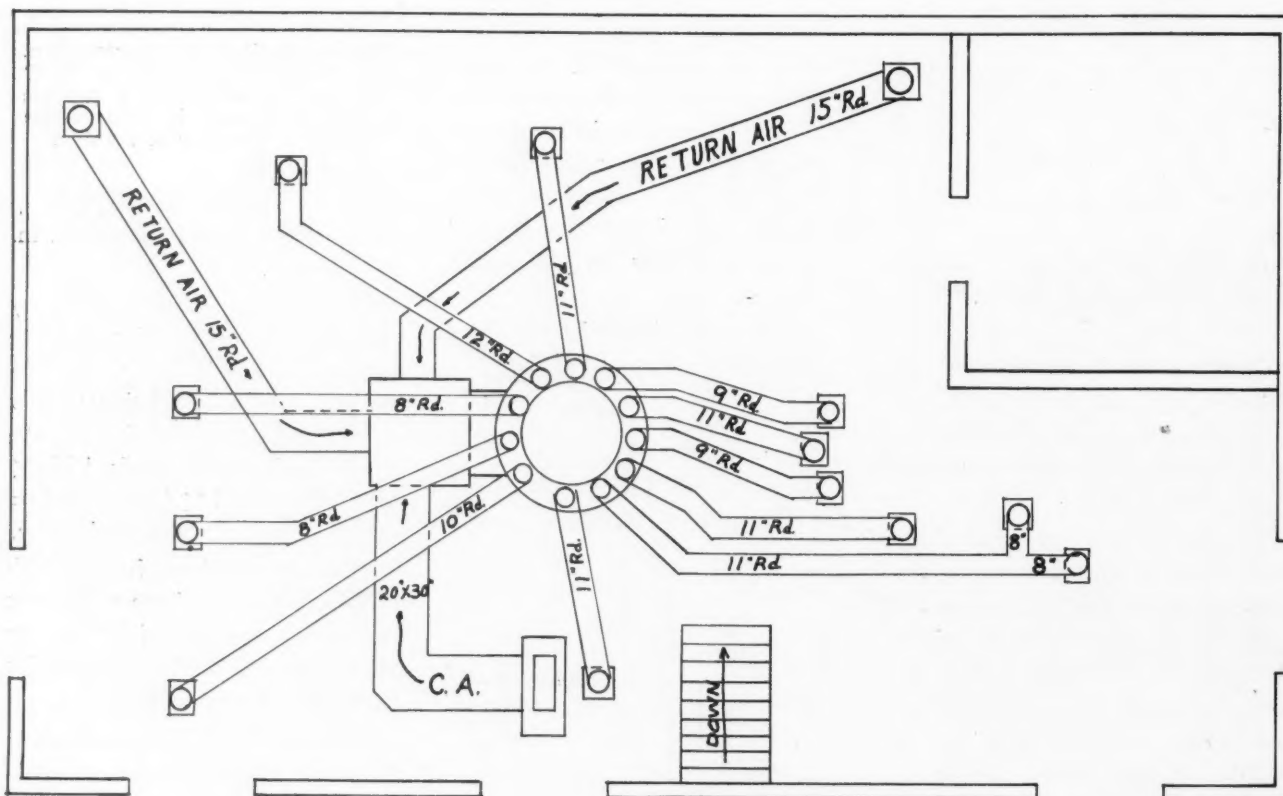
But in most cases the folks who built these houses did not place as much emphasis on heating as we do today. If there was a bedroom which was cold most of the winter, the owners called it the "cold" room and let it go at that. Sometimes they called in a local heating contractor and told him to remedy the trouble, but in most cases they just didn't bother.

Today, however, the situation is radically different. We want our houses warm. Not just hot or cool, but we insist that the temperature stand hour in and hour out at a predetermined point which we think

makes the most satisfactory temperature for our family.

Even more important we will not have rooms which are hard to heat or which will not keep a uniform temperature. So the people who live in these large houses are demanding a new kind of heating comfort and the warm air heating men who operate in the eastern part of the country find a large part of their work consists of replacement jobs which require ingenious engineering and wider than ordinary heating knowledge.

In Boston, the Trask Heating Company has many such jobs to its credit. This well established heating firm does warm air heating all up and down the eastern coast. It



The heating layout for this large house shows a well balanced return air system with, however, long runs of pipe. Since this is a blower job this does not matter particularly. The warm air runs are well balanced. Each leader has a damper for adjustment of air flow

is prepared to offer good engineering service and to lay out heating plants with any of the modern equipment such as gas, blowers or fans, humidifiers, flat duct work, oil burners, etc.

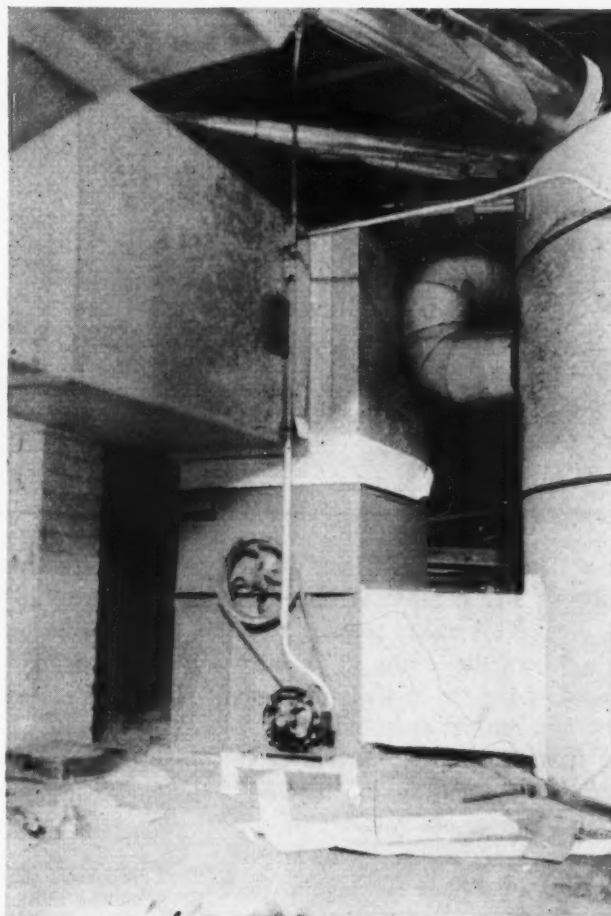
The pictures and the heating layout shown on these pages illustrate the revamping of an old heating system in a large house. In remodeling this job all the old stacking was torn out and an entirely new system was built into the house.

The foundation of the new system is a Richardson and Boynton 33-inch furnace, burning coal. Attached to the furnace is a Silentaire blower. The new system is forced air throughout and was designed for this kind of heating and not for gravity. The house has some 50,000 cubic feet inside, so a large furnace and blower were required.

Some remodeling was done upstairs while the heating plant was being revamped so some of the old stacking runs were eliminated and new locations chosen. All the new stacking is of the single wall type and was put in the partitions without any wrapping and without any insulation. This was possible since the partitions were thick and allowed plenty of air space around the stacks.

The casing of the furnace has a flat topped bonnet and all the warm

This is the return air side of the heating plant. All the returning air is brought to the central mixing chamber above the blower. The canvas collars shown are described in more detail in the text. So is the mounting for the motor



air leads are taken out of the top of the bonnet through elbows right at the casing. All the leaders are bright tin, unwrapped, except at the joints where asbestos paper was used.

In the first straight section of leader pipe a damper was installed.

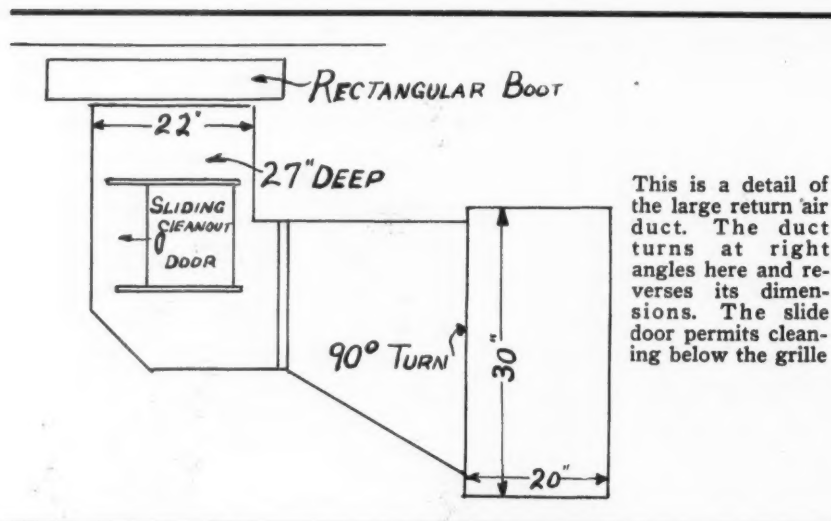
This damper serves to control the amount of air passing through the pipes. Where there are hard-to-heat rooms, or rooms at some distance from the furnace, the damper is left wide open and the full volume of warm air is permitted to pass into these rooms. On the other hand, rooms close up to the furnace, or easy to heat, are choked off as required. Through the use of these dampers it is possible to balance the system so that every room gets its right share of air.

All the warm air leaders are round pipe. All are individual leads excepting one which has two outlets at the end of the line. Some jogging around pillars was necessary, but on the whole there was head room enough and free passage enough to permit each lead to be run right from the bonnet to the boot. In spite of the large floor area of the house the system is fairly compact and has no long individual runs to cause trouble.

The return air side of the system



The front of the heater shows a number of leaders coming off the bonnet. As a matter of fact the leaders are almost continuous around the bonnet



is not so compact. In fact, the return air side consists of long runs of pipe. This makes possible a system where the warm air is introduced at the inside walls of rooms and is taken out from outside walls or from halls. There are three return air systems in the basement. Two of these are round pipe, galvanized, while the third, and largest, consists of a huge rectangular duct which turns and reverses its dimensions, all within a travel of a few feet.

This particular rectangular return air duct has some interesting features. One of the illustrations show details of the duct's construction and features.

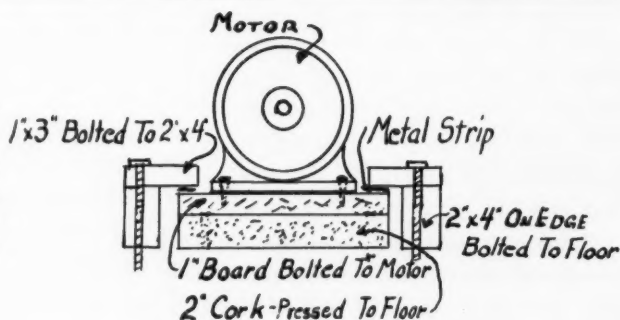
All three of the return air ducts dump into the housing of the blower. Before reaching the blower chamber the air is pulled through filters to clean the air. The blower is connected into the casing through a short neck and is insulated from the casing and from the return air mixing chamber by canvas collars. In placing this canvas on the iron a completing metal band was used. This band hid the edges of the canvas and eliminates ripping and pulling of the canvas from the iron.

This band is made of a 2-inch galvanized strip long enough to reach clear around the housing. The top edge of the strip is turned back and under like a flat locked seam to make a rounded edge. This goes at the top of the canvas. The lower edge is then screwed into the gal-

vanized iron and the spring of the iron makes the turned under top fit snugly against the canvas.

The motor which drives the blower is placed outside the housing

This shows the ingenious mounting of the motor. This system provides insulation and enough movement to prevent pulley breaks



and is fastened to the floor. One of the drawings shows a detail of this fastening. It has been worked out so that there is no vibration of the motor and no noise. There is, however, enough "give" to the anchor so that any strains on the pulley are taken care of without breaking the pulley.

Most contractors make more money in replacement work than in new houses. The secret is to sell as many accessories as possible. On this job changing to forced air worked in a blower and extra large ducts.

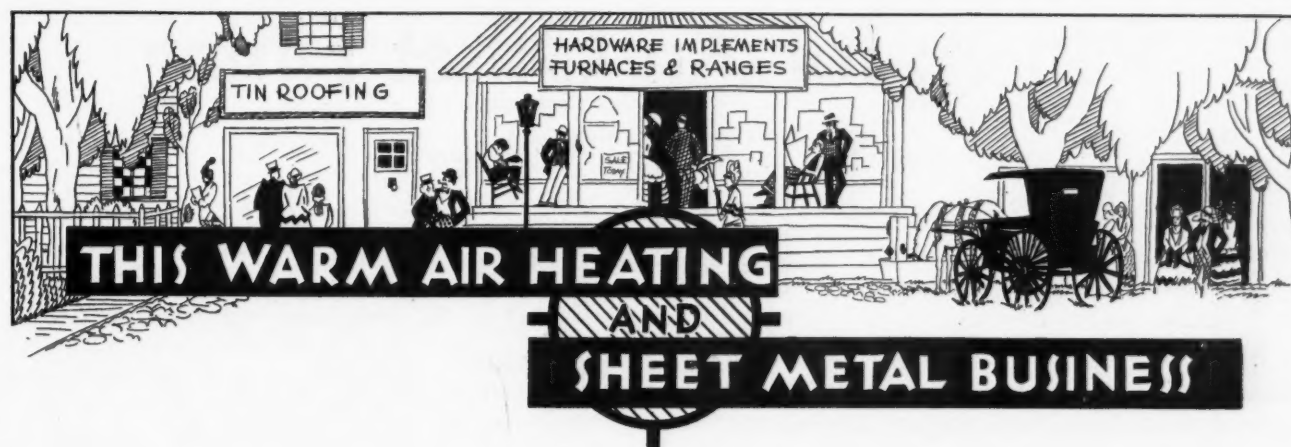
It might be explained that the large insulating block is cork and this is not fastened to the floor. Pressure on the motor block, applied through the two-board anchors at each end holds the cork in place and keeps the motor from creeping. The metal strip is to eliminate wear on the block and cork.

The system has been made automatic in operation through the use of dual control. A Minneapolis-Honeywell house thermostat opens and closes the drafts and checks. All that is necessary is to feed in the coal and shake out the ashes. The operation of the blower, however, is dependent upon conditions within the casing. A Mercoid control at the bonnet turns on the blower when the inside temperature

reaches 125 degrees. At this temperature the blower operates at low speed. When the inside temperature reaches 150 degrees the blower operates at high speed and continues thus until the temperature drops down to 125 when the blower goes into low speed again. The blower is shut off when the temperature drops below 125 degrees.

This arrangement takes care of every condition in the house and in the furnace. The blower will continue to operate in high if the furnace is not checked off, and will not start until heat has been worked up inside the casing.

Proper humidity inside the house is taken care of automatically by a humidifier of Richardson and Boynton manufacture installed above the furnace in the bonnet.



THE SALESMAN

By BENJAMIN F. JOHN

THERE is no man in our industries, especially in the warm air heating industry, who can do more to lift the industry to a higher level, than the well informed factory salesman.

Some folks and a lot of firms, too, think a salesman should be judged by the number of orders he turns in and how low he keeps his expense account. If he does these two things well, he is seldom asked questions.

Naturally, then, the majority of salesmen are interested *ONLY* in immediate orders. The more orders they get the more will be their commission or bonus or salary and the higher will be their names on the roster of salesmen at the end of the year.

The great ambition seems to be to sell in carload lots. And this is not wrong if the contractor is able to buy and sell in quantities that large. The big danger is that the salesman, through high pressure methods, will sell carloads to the dealer who can't and shouldn't buy that many furnaces at one time.

A lot of salesmen say—"Well, if I don't sell him more furnaces than he thinks he ought to buy, someone else will come along and sell him more furnaces. If I sell him so many furnaces that he becomes afraid he won't dispose of them inside the terms of the contract, then he gets out and digs like the mis-

chief. And the result is that he moves those furnaces."

But I believe that the salesman ought to remember and the manufacturer certainly ought to insist that the salesman take orders for only the number of furnaces the dealer can and should sell. To sell more than this number is to harden and handicap the contractor against all heating work and destroy the dealer's confidence in the manufacturer.

Now some bright reader is going to say—"Well, how are we going to tell whether a dealer can sell 45 furnaces or 55 furnaces?"

That's just where the good salesman comes into the picture. He is the man who certainly should know more about that particular dealer than any one else outside the dealer's intimate business and domestic family.

If the salesman doesn't know whether a dealer ought to buy 45 or 55 furnaces, then he isn't a very good salesman. Yes, he may be a darned good high pressure salesman, but somehow or other in this furnace business, these high pressure boys just don't seem to stay.

Why?

All of you readers know the answer to that just as well as I do. We're all human. A man may come

in and talk fast and fancy *ONCE* and load us up, but that salesman oughtn't come back for another order.

To sell a carload of furnaces to a contractor who isn't financially able to buy that many, or to consign on a long dating when the contractor's yearly sales won't consume a carload of furnaces certainly doesn't do anyone any good. Any one who has been through that experience and remembers the drubbing he got from the credit department of the manufacturer remembers how embittered he was after it was all over.

I don't believe many of us would have trouble remembering an example of this situation. I know of many where the contractor was billed as of January 1, a year or two after the purchase and some of the furnaces were still on hand. As a matter of fact it will be several years before some of these cases I can recall will have the principal and interest paid or the furnaces sold. The contractors are so mad they just don't want to sell those furnaces.

The good salesman, in an astounding number of instances, has to be a sort of wet nurse to his dealers. He has to advise and suggest and lead their thoughts and see that they avoid all the pitfalls which lie along the path of warm air heating. If he does all these things, I say he is a good salesman.

Pattern for An Offset Fitting

For J. A. White, Chicago

THE accompany problem was submitted by an Illinois reader of the *AMERICAN ARTISAN*.

First draw the plan view of the fitting. This view represents the top of the fitting. Divide the arc drawn with the $1\frac{3}{4}$ -inch radius into three equal spaces. From each of these divisions draw horizontal lines intersecting the arc drawn with the $7\frac{1}{16}$ -inch radius and divide the remaining part of this arc into three equal parts. Now from these points draw horizontal lines intersecting the line 4-7 and number all points on the plan view as shown. Now drop lines from points 1, 8, 7, and 14 on the plan view and on the lines dropped from 14 and 7 step off the distances a-c and b-d equal to the long side of the rectangular opening, in this case 10 inches. Next on the lines e-g and f-h, dropped from points 8 and 1, step off a distance equal to the short

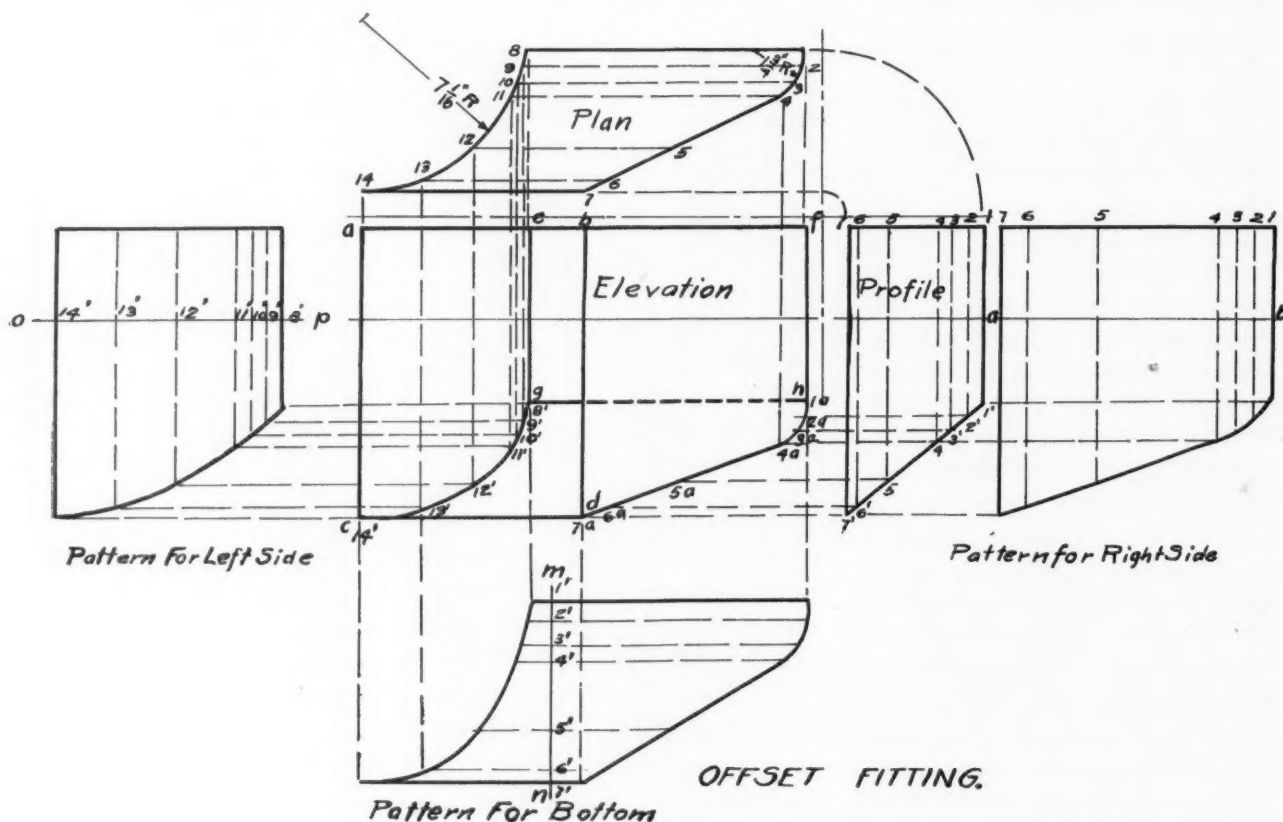
By **L. F. HYATT**
Contributing Editor

side of the small opening of the rectangle, in this case 6 inches. Draw a line from a to f completing the top of the elevation.

Before beginning the profile draw the arcs shown by the dash lines. From the points of intersection of these arcs and the center lines drop lines of indefinite length as shown at 7-7' and 1-1'. Now from points h and d on the elevation draw horizontal lines intersecting the lines dropped from the arcs previously drawn and draw the slanting line representing the lower side of the fitting 1' to 7'. The arcs are now drawn from points 2, 3, 4, 5, 6 on the plan as was done from the two points 1 and 7, intersecting the horizontal lines from these points locating points 1', 2', 3', 4', 5', 6', 7', thus completing the profile view.

It is now possible to obtain the curved lines in the elevation view. Drop lines from points 1, 2, 3, 4, 5, 6, 7 also 8, 9, 10, 11, 12, 13, 14 on the plan. Next draw horizontal lines from 1', 2', 3', 4', 5', 6', 7' on the profile view, intersecting the lines previously drawn from the plan view, and through the points of intersection draw the lines 1a, 2a, 3a, etc., and 8', 9', 10', 11', etc., thus obtaining the correct curve.

We are now ready to proceed with the patterns for the fitting. The plan view is of course an accurate pattern for the top of the fitting without allowance for seams or laps. To obtain a pattern for the right side of the fitting first draw the stretchout line a-b and upon this line step off the distances 1-2, 2-3, 3-4, 4-5, 5-6, 6-7 found on the plan view of the fitting. Through these points draw vertical lines as shown on the pattern for the right



side. Now draw a horizontal line from point 1 on the profile, this line determining the upper edge of the pattern. Next draw horizontal lines from points 1', 2', 3', etc., on the profile, intersecting the vertical lines just drawn, and through these points of intersection draw the line describing the lower edge of the pattern for the right side of the fitting.

Next draw the stretchout line m-n for the pattern for the bottom of the fitting and upon this line step off the spaces 1', 2', 3', 4', 5', 6', 7' found on the profile view. These

spaces will give the true length of the bottom of the pattern. Next draw horizontal lines through each of these points on the stretchout line. Lines are now dropped from points 1, 2, 3, 4, etc., on the plan view, intersecting the horizontal lines 1', 2', 3', etc., drawn through the stretchout line m-n. Lines drawn through these points of intersection will correctly describe the outline of the pattern for the bottom.

Finally, on the stretchout line o-p step off distances 8-9, 9-10, 10-11,

11-12, etc., found on the plan view. Through these points draw vertical lines of indefinite length. From point a on the elevation draw the horizontal line describing the top of the pattern for the left side. Now from points 8', 9', 10', etc., found on the elevation draw horizontal lines intersecting the vertical lines of like number drawn through the stretchout line o-p. The curved line drawn through the points of intersection will complete the pattern.

No allowance for seams or lap has been made on the patterns.

Development of a Pattern for a Spiral Conveyor

For J. E. Newcomb, Dixon, Illinois

By W. R. HAINES
Contributing Editor

FIRST draw the plan view. A quarter size is given, that being sufficient to give a correct ratio of the full conveyor. Divide the plan into any number of parts, as from 2 to 14 or 38 in this case. Draw lines to the apex, which also subdivides the smaller circle. Next measure the altitudinal line for the 43-inch drop that the spiral is to make in the three-fourths turn, and divide this into the same number of equal spaces shown in plan. If only a quarter plan is used, use only a quarter altitude; but in this case we use the full plan and full altitude. Thus, the altitude would be divided in three parts, if a third of the quarter plan were used as we do.

These altitudinal spaces then give the correct rise between each space of plan. This is shown at A where we have the true lengths for the three lines used. Thus, h-t is the altitude of one space, and 2-4, 2-3 and 1-3 of plan are transferred to the base line as t-3, t-2 and t-3', while the plan line 1-2 retains its width all the way around the conveyor. Then h-3, h-2 and h3' are true lengths. The line h-3 is for

the small girth around the post, while h-2 is for the heel girth, and h-3' is the dotted cross line 2-3 in plan.

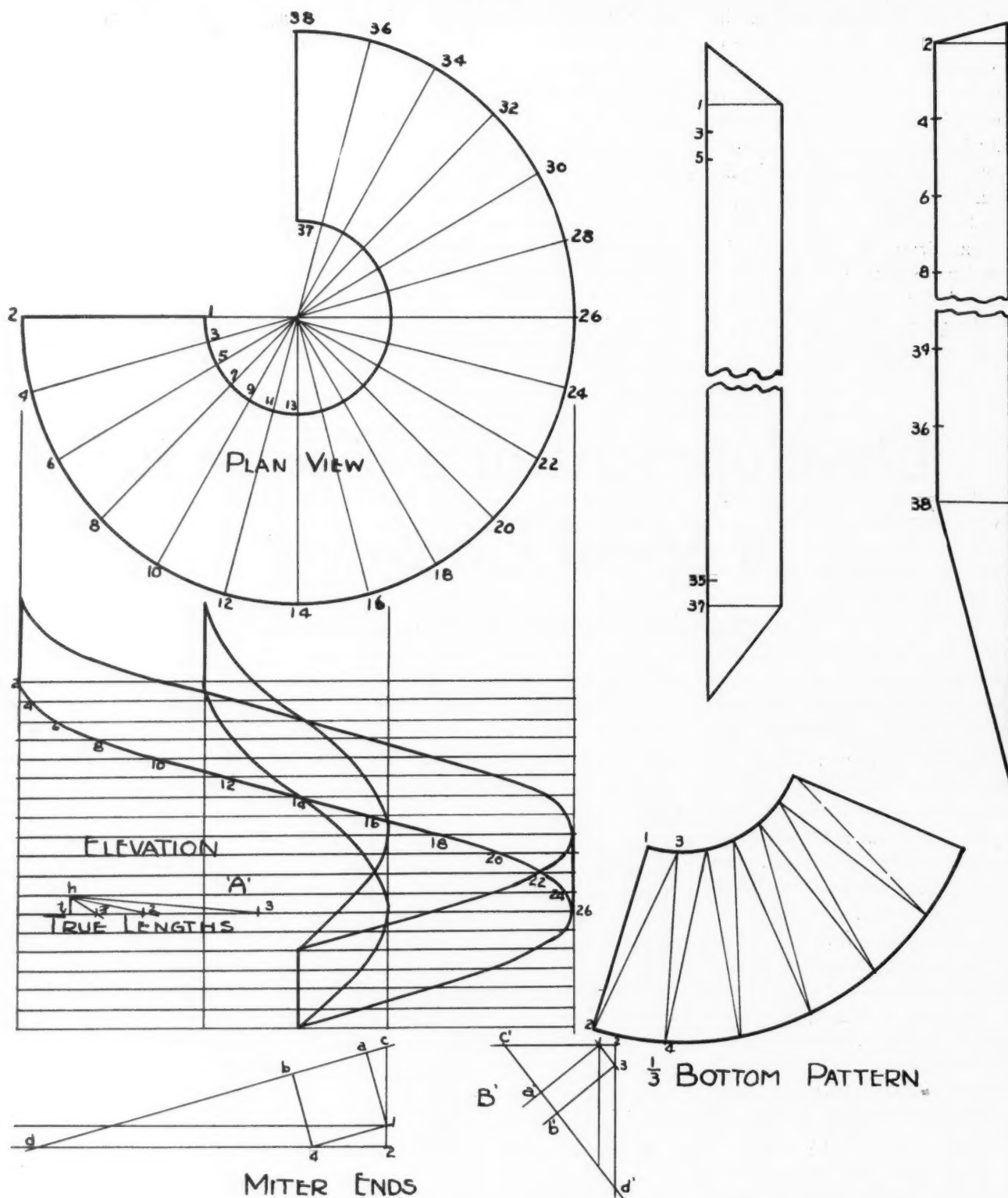
To develop the pattern for the bottom of conveyor, draw any line, as 1-2, equal to 1-2 of plan; then with dividers, pick the true girth h-3 and h-2 from A, and with 1 and 2 in pattern as center, strike arcs as at 3 and 4. Then pick true length h-3' from A and using point 2 in pattern as center, cross arcs at 3. Then pick plan line 1-2, and using the new point 3 as center, cross arcs in point 4. Repeat this

operation by striking arcs 5 and 6 equal to the girths h-3 and h-2, and then cross with true length h-3' and 1-2 of plan, establishing the new points 5-6 in pattern.

In this way develop as much of the pattern as you can handle, or a third in this case. In order to take the twist out and make the bottom lie level, part of it must be stretched and another part shrunk or drawn, so it is not well to make these patterns too large. It is always easier to handle and work the twist out in the rivet lines than to try to force the solid sheet.

Now the sides of the conveyor are merely straight strips, with miter lines cut at the top and bottom. This is shown at B, where 1-2 is the rise of one space of the 43 inches. The space 2-4 is transferred from plan, so that the line 1-4 will be a true length of girth, or is the same as h-2 of A. Then square out lines as 1-a and 4-b, equal to the width of the side strips. Then the vertical line 1-c-a will be the top mitre line, and by extending the line c-b to d, then 4-b-d is the proper miter line if the side is to

This pattern service is free. If you have a pattern which is causing trouble send in the details and one of our contributing editors will try and work it out. But be sure that you send all the details.



PATTERN FOR SPIRAL CONVEYOR

finish on the floor. But if it is to have a vertical cut, the miter 1-a-c is used.

The proper girth for these strips would be to take 18 spaces times the line 1-4 of B, or h-2, which

gives the distance 2-38, and beyond this add the miter cuts as shown. A similar diagram as at B is made for the throatstrip. This is shown as C, where 1-2 is the rise and 2-3 is the plan girth 1-3, so that 1-3

becomes the true length, and by adding the width of strip, and drawing miter line, we can then lay off the pattern as shown. Laps for riveting the edges must be allowed extra on this pattern.

Efficiency of Warm-Air Systems Increased by Use of Fan

THE general principles applied to forced circulation warm-air heating systems are not new. For many years fans have been used in connection with the heating and ventilating systems of large buildings, such as theaters, auditoriums, stores and office buildings. The most recent development in the application of forced circulation in warm-air heating has been to residence heating, and the committee in this report has endeavored to outline the use and application of fans to residence warm-air heating systems, and some of the results which are obtained.

In residence warm-air heating, two general systems are in use. First is the application of fans to gravity designed systems, and the second is trunk designed systems where circulation depends entirely upon the fan.

Application of Fans to Gravity Designed Systems

There are several methods used today in the application of fans to gravity designed systems. These several methods will be briefly described as follows:

1. The fan is applied to the cold air intake by installing a fan box or orifice, no provision being made for gravity flow. The only gravity flow which can take place when the fan is not operated is through the free area in the fan orifice.

2. There are two systems in use today which combine the fan and gravity systems and allow the operation of the heating plant on the gravity system when the fan is not in operation:

a. One combination fan and gravity system widely used pro-

vides for the installation of the fan in the cold air duct of the furnace. By the use of bypass louver dampers in conjunction with the fan, air is by-passed around the fan as well as through the fan orifice when the fan is not running. When the fan is turned on, the air pressure built up in the furnace casing automatically closes the bypass louvers.

b. A second combination fan and gravity system provides for the in-

stallation of a large slow-speed fan in the bonnet of the furnace. The air is drawn up around the furnace and forced through the outlet ducts. This system allows for gravity circulation when the fan is not running, by the hot air passing through the large area between the plates of this large slow-speed fan.

Forced Circulation and Trunk Systems

The design of forced circulation

COMPARISON OF GAS CONSUMPTION FOR FURNACES WITH AND WITHOUT FANS INSTALLATION NO. 1

Without Fan				With Fan			
		M.C.F.				M.C.F.	
		Natural Gas	Degree Days			Natural Gas	Degree Days
October	1927	7	108	1928		20	196
November	1927	38	538	1928		41	622
December	1927	76	1076	1928		51	807
January	1928	62	886	1929		62	1196
February	1928	53	767	1929		49	1053
March	1928	37	532	1929		28	475
April	1928	28	386	1929		19	309
		301	4293			270	4658

Cubic feet per degree day, 70. Cubic feet per degree day, 58. Saving with fan, 17.1 per cent.

INSTALLATION NO. 2

INSTALLATION NO. 2						
October	1927	11	108	1928	25	196
November	1927	49	538	1928	50	622
December	1927	103	1076	1928	71	807
January	1928	80	886	1929	64	1196
February	1928	75	767	1929	78	1053
March	1928	36	532	1929	33	475
April	1928	30	386	1929	29	309
		<hr/>	<hr/>		<hr/>	<hr/>
		384	4293		350	4658

Cubic feet per degree day, 89. Cubic feet per degree day, 75. Saving with fan, 15.7 per cent.

INSTALLATION NO. 3

October	1927	7	108	1928	20	196
November	1927	32	538	1928	29	622
December	1927	66	1076	1928	42	807
January	1928	57	886	1929	48	1196
February	1928	52	767	1929	41	1053
March	1928	38	532	1929	26	475
April	1929	35	386	1929	19	309
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		287	4293		225	4658

Cubic feet per degree day, 67. Cubic feet per degree day, 47½. Saving with fan, 29 per cent.

*From a report of the Subcommittee on Fans, F. M. Rosenkrans, chairman, at the American Gas Association Convention, Atlantic City, N. J.

GAS CONSUMPTION OF FURNACE-FAN SYSTEMS

The following data have been submitted on five fan installations at St. Louis, Mo.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) Actual Gas Used			(10)	(11)
No. Furnace	Fan	Control	Heat Loss	Furnace Rating	Leader Area	Return Area	Gas Co. Estimate	1926-7	1927-8	1928-9	B.t.u.	B.t.u. per sq. in. 1928-9
1	Bryant 40 L No. 800	Miles Dual	142,035	140,800	608	680	480 MCF	243,200	246,200	264,400	565	246,000
2	Bryant 60 L No. 1500	Miles Dual	201,786	211,200	1016	1008	681 MCF	.....	.....	576,000	565	321,000
3	Bryant 70 L 21 in.	Sirocco Dual	252,000	246,400	1258	1062	.....	852,603	783,230	719,000	565	323,000
4	Bryant 40 L 16 in.	Wagner Dual	121,605	140,800	642	750	410 MCF	.....	.....	300,500	565	265,000
5	Bryant 40 L 16 in.	Wagner Dual	165,890	140,800	692	731	560 MCF	.....	.....	389,600	565	31,800

and trunk systems is worked out on the same general principles as gravity systems. Due to the higher air velocity secured through the use of the fan, smaller ducts are used than in gravity designed systems. The trunk systems differ from the gravity designed systems in that a trunk duct is taken off the furnace, and the ducts to the various rooms branch from the trunk. The circulation of air is entirely accomplished through the means of a fan.

Gas furnaces which are designed primarily for forced circulation and trunk systems are now on the market. Combined with the furnace is the necessary fan equipment and provisions for control apparatus.

In the application of fans to warm-air residence heating, there are several methods by which the fan is controlled:

1. The fan may be connected in parallel with the gas control, operating only when the gas is turned on in the furnace. The disadvantage of this method of controlling the fan is that it retards the raising of the furnace temperature and the quick delivery of warm-air to the space to be heated.

2. The usual method of fan control is by means of a contactor device installed in the bonnet of the furnace. When the temperature of the bonnet of the furnace reaches a predetermined point, the fan is automatically turned on. After the gas fuel has been shut off and the temperature of the bonnet of the furnace drops below the predeter-

mined temperature, the fan automatically shuts off.

3. A third system used is the combined use of the contactor device installed in the bonnet of the furnace and the gas control. In this system the contactor device turns the fan on when the temperature reaches a predetermined point. The shutting off of the gas fuel automatically shuts off the fan.

4. A safety device is used in connection with fan installations to shut off the gas fuel in case the fan is not turned on. This device is installed in the bonnet of the furnace and automatically shuts off the gas when the furnace bonnet temperatures reach a predetermined maximum. This device protects the installation, should trouble develop in the devices which control the fan and prevent it being turned on.

Advantages of Forced Circulation in Warm-Air Heating

Endeavor will be made to outline briefly some of the major advantages of forced air circulation through the use of a fan:

1. The furnace may be located in any part of the basement, thus allowing the use of the basement floor space to the greatest advantage. The trunk lines coming from the furnace do not interfere with head room.

2. Even temperatures can be maintained throughout the entire building and larger residences can be heated with a fan system, where the wisdom of installing a strictly gravity system would be doubtful.

3. Air changes of four per hour can be easily obtained with the fan system, instead of the usual one and a half air changes per hour calculated for the gravity system.

4. Ability to more rapidly raise temperatures of a building.

Advantage of Fan in Overcoming Troubles

In many gravity warm-air installations, difficulties which may develop in connection with the functioning of the installation can be overcome by the use of a fan. A fan installation is the means of easily correcting the following deficiencies in a warm-air installation:

1. Inadequate pipe areas for the amount of space to be heated.
2. Long flat leader pipe runs from the furnace.
3. Insufficient cold air return ducts.
4. Incorrect location of the furnace.

While the committee has been unable to secure much test data, calculations indicate that the overall heating efficiency through the use of a fan is greater than with a purely gravity warm-air system. The average temperature of furnace castings under normal gravity service may be 600 deg.; with the installation of a fan and the increased velocity of air circulation through the furnace, the furnace castings are subject to a cooling effect and temperatures may be reduced as low as 300 deg. This increased absorption of heat by the larger volume of air passing from

the furnace castings, and the consequent higher rate of heat transferred through the castings, lead to the conclusion that efficiencies are increased.

The use of fans on warm-air installations result in higher velocities in furnace pipes and greater volume of air in pipe area. This reduces to some extent the heat losses from the pipe system. The amount of heat delivered per square foot of pipe area can be increased from 50 to 100 per cent through the use of a fan, over that delivered on a strictly gravity system.

While register temperatures of 175 deg. are usually used in calculating a gravity system, register temperatures of from 135 to 150 deg. are shown on fan systems.

Humidification of warm-air systems is accomplished in two ways: First, evaporation from a water pan installed in the furnace; second, by spraying water into the heating chamber. Attention to air conditioning in the home where warm-air systems are installed is a most important feature. The gas-designed systems on the market today, incorporating fans in their design, have humidifying apparatus which may be adjusted properly for a given installation.

RANGE HOOD

(Continued from page 29)

of dividers in a layout of this kind, of the round opening, as 1 to 2, etc. Now, divide the 7-inch diameter,

which has a circumference of 22 inches into 12 equal parts, using a straight line 22 inches long, divided into 12 equal parts, for getting distances between points 1, 2, 3, 4, etc. If the circle itself is used as a measure instead of the straight line, as in many drawings, the collar does not fit well on the hood.

Next set your dividers at D4 on plan view. Then measure off this distance on the base line using the point of intersection of the base and straight height lines as one point; thus you will get point 4 on your one pair to keep set for the spaces base line. Then, keeping one point of the dividers on this point 4, open them up to the straight height point. Using this distance as your radius and D on your development as a center, scribe an arc crossing the vertical height line. Set dividers on B as a center, and with the same radius scribe another arc crossing the first on the vertical line. This locates point 4. Then set your dividers on D5 in plan view. Measure off this distance on the base line, using the point of intersection of the base and straight height lines as one point, thus you will get point 5 on your base line. Then, keeping one point of the dividers on this point 5, open them up to the straight height point. Using this distance as your radius and D on the development as a center, scribe an arc. Then, with point 4 as a center and 4-5 as a radius, scribe another arc intersecting the first. Thus we lo-

cate point 5. In this same manner exactly points 2, 3 and 6.

Then, starting from the beginning again using points C7, etc., develop the end pattern. This, of course, is one-half the entire hood.

OVERHEAD

(Continued from page 25)

goes ahead anyhow. That which does not go ahead holds over to another year, to become a profitable business then.

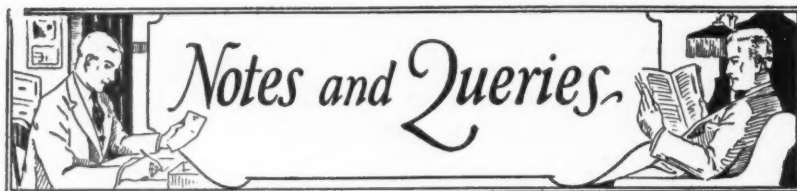
But if the trade in any community cuts prices to the artificial low point at which it cannot permanently exist, it loses on normal business, and invites other losing business which otherwise would be profitable business later on. The end of the year finds these tradesmen hard up, behind in their bills, a drag on the community as a whole.

You might be surprised to know that certain shrewd and sound executives recommend higher prices during slack periods than during normal periods. I am not going so far as that. I am not even saying that a man should necessarily hold out for his entire profit at all times, although I personally believe that it would be good business if he would. But I stoutly maintain that a contractor should always get his full overhead, including his own salary or wages no matter how hungry he thinks he is for business. Then if he has based his overhead on last year's business he is certain that he will come out all right in the end.

HAVE YOU PICTURES OF ANY OF YOUR OLD JOBS

American Artisan is this year celebrating its fiftieth anniversary. In the big annual issue which comes out December 20 we are going to show a lot of the furnace, sheet metal and roofing jobs you readers did 15, 25 and more years ago. We are going to need a lot of pictures. If you have any we would like to borrow them. We'll take the best of care of them and return them to you promptly. If you have such pictures mark them with your name and address, tell us when the job was done, what condition it is in today and as much about it as possible.

Here's a way to get your past workmanship into print.



"Robertson" Ventilator

From Freise & Knebes Sheet Metal Shop, La Crosse, Wisconsin.

We should like to know who makes the "Robertson" ventilator.

Ans.—The H. H. Robertson Company, Grant Building, Pittsburgh, Pennsylvania.

Repairs for "Riverside Aer-Duct" Heater

From A. J. Bridges, Bedford, Iowa.

Where can I buy repairs for the "Riverside Aer-Duct" heater?

Ans.—From the manufacturers, Rock Island Stove Company, Rock Island, Illinois.

Steel Spring Wire

From R. H. Vandeveld & Company, Dyersburg, Tennessee.

Please advise us where we can buy .014 steel spring music wire.

Ans.—Steel Sales Corporation, 129 South Jefferson Street, Chicago, Illinois.

Furnace Fans for Top of Furnace

From Ace Furnace and Steel Works, Tacoma, Washington.

Who makes the furnace fan which is installed in the bonnet on top of the furnace?

Ans.—The A. H. Robinson Company, Massillon, Ohio.

"Sirocco" Fans and Blowers

From The Kitzelman Company, Chicago, Illinois.

Can you tell us who makes the "Sirocco" fans and blowers?

Ans.—American Blower Company, 6000 Russell Street, Detroit, Michigan.

Silver Solder

From J. C. Hinderer, Fort Wayne, Indiana.

Where can I get silver solder that will melt at about 1000 degrees? I do not want it in wire or ribbon form.

Ans.—Goldsmith Brothers Smelting and Refining Company, 29 East Madison Street, Chicago.

Porcelain Enameled Letters

From J. F. Dible, Carey, Ohio.

Can you inform me where to get porcelain enameled letters for signs?

Ans.—George Steere, 434 South Dearborn Street, Chicago.

Electric Furnace for Heating Soldering Irons

From Wm. R. Neal Sheet Metal & Welding Works, Jacksonville, Fla.

Does anyone manufacture an electric furnace for heating soldering irons in a sheet metal shop?

Ans.—Yes; Bellevue Industrial Furnace Company, Detroit, Michigan.

"Metalute"

From Columbia Sheet Metal Works, Chicago, Illinois.

We are interested in "Metalute," advertised in your publication by the Technical Products Company of Pittsburgh. Have they a Chicago representative?

Ans.—Yes; F. D. Farnam and Company, 209 North Desplaines Street.

V-Shaped Fan Belts

From John R. Hopkins, Pueblo, Colorado.

Please give me the name of a firm that makes extra long V-shaped fan belts.

Ans.—Panama Rubber Company, Inc., 2354 Lincoln Avenue, Chicago, Illinois.

Sign Plates

From George Bishoff, Marinette, Wisconsin.

Where can I get sign plates to be stamped out of 18 gauge black iron?

Ans.—Chicago Metal Manufacturing Company, 3724 South Rockwell Street, Chicago.

"XXth Century" Furnace

From Central Heating and Manufacturing Company, Chicago.

Can you tell us who manufactures the "XXth Century" warm air furnace?

Ans.—XXth Century Heating and Ventilating Company, Akron, Ohio.

Furnace Repairs

From Fred H. Brown, Champaign, Illinois.

Please give me the names of furnace repair concerns, particularly the firm in Dayton, Ohio.

Ans.—The firm in Dayton, Ohio, is the National Foundry and Furnace Company. Other furnace repair firms are: Metzner Stove Repair Company, 515 Wyandotte, Kansas City, Missouri; Niehaus Furnace Repair Company, Cincinnati, Ohio, and Northwestern Stove Repair Company, 654 West Roosevelt Road, Chicago.

Used Tinner's Burring Machine

From The Leathercraft Shop, Salt Lake City, Utah.

Please give us the names of a few firms that can supply a second-hand tinner's burring machine for cutting and rolling leather thongs.

Ans.—Interstate Machinery Company, 601 West Monroe Street, and Maplewood Machinery Company, 2638 Fullerton Avenue, both of Chicago.

Repairs for No. 240 Specialty Coal Heater

From Vogler and Zipfel, Wheeling, West Virginia.

We want to get a grate for a No. 240 Specialty Coal Heater, which we believe was made by Thomas, Roberts, Stevenson Company, who are out of business.

Ans.—This heater is made by Cole Manufacturing Company, 3218 South Western Avenue, Chicago, Illinois, who can furnish repairs for it. Thomas, Roberts, Stevenson Company were undoubtedly jobbers for it.

Key Blanks

From Henry Kesler, El Paso, Illinois.

Please inform me who makes key blanks.

Ans.—Corbin Cabinet Lock Company, 319 West Randolph Street; Eagle Lock Company, 177 North Franklin Street; Sargent & Greenleaf, Inc., 562 West Washington Street, and Yale & Towne Manufacturing Company, 2900 North Western Avenue, all of Chicago.



ASSOCIATION ACTIVITIES

California Has New State Assn. of Heating Contractors

The California Warm Air Heating Association has recently been organized. Walter Mork was elected president and Ralph Bell, secretary of the new organization.

The personnel of the by-laws committee includes William Murray, Mathew McGee, Ralph Bell, Walter Mork and Fred McDonald.

One of the requirements for membership is that the individual members be Co-Operative members of the National Warm Air Heating Association.

Committee of Ten Holds First Sectional Meeting at Peoria, Ill.

Starting off with a rousing impetus, the first of a series of meetings sponsored by the Committee of Ten—Coal and Heating Industries was held at the Creve-Coeur Club, Peoria, Illinois, Tuesday evening September 30.

The meeting was presided over by Mr. George Harms—Treasurer of the Committee of Ten and representative of the National Association of Sheet Metal Contractors, one of the ten co-ordinated industries making possible this forward step in modern heat merchandising. Mr. Harms briefly explained the rapid changes that were coming in the heating field and explained that it was felt that closer contacts

should be made between certain groups who could materially assist each other in solving a serious problem now confronting the heating industry.

In keeping with meetings to be held in Pittsburgh, Cincinnati, St. Louis, Cleveland, the Peoria meeting was designated for the initial start; and as explained by Mr. Harms was the start of a movement which is destined to add new activity—not alone to coal, but heating industries as well.

Mr. Harms was followed by Mr. Carlyle M. Terry of Chicago who represents the Anthracite Industry on the Committee of Ten. Mr. Terry sketched the work and activities of the Committee of Ten since its formation.

Several of the outstanding local representatives of the Coal and Heating Industries in attendance at the Peoria meeting were:

Mr. Swanson, Uplands Hardware Co.

Mr. Geo. Harms, F. Meyer & Bro. Co.

Mr. Moffett, Dooley Brothers.

Mr. Meyer, Peoria Fuel Co.

Mr. Chester Swords—Coal.

Mr. McIlvaine, Lake Erie Mining Co.

In order to carry on the Committee of Ten movement in Peoria, a motion was made and passed to create a local Committee with Mr. Geo. Harms acting as chairman.

SHAKER CITY HALL

(Continued from page 22)

there are two copper decks just off the dome. These are flat locked and soldered. All the downspouts are rectangular copper with copper straps and stamped copper conductor heads of ornate design.

One of the architectural features of the front of the building is a high portico which has a semi-domed copper roof and copper cresting. The roofing sheets on this portico are flat locked and soldered. The cresting is of standard stampings without external bracing.

The gutters on the main roof are of the box type. The slate of the roof comes clear down to the eave edge at the ends of the building, but from a point approximately one foot in from the end the slate ends two slate rows up and the gutter begins. The copper lining of this gutter is all formed out of one sheet which is carried down the back side, across the bottom of the gutter, and turned under at the cornice edge.

The wing at the back of the building is a flat roof on which the metal contractor did no work. There are, however, several large copper gravity exhaust ventilators on this roof for the toilet rooms below. There is also one large copper skylight which has copper ventilators in the end of the skylight. These are shown in one of the illustrations.

OUR FIFTIETH ANNIVERSARY NUMBER

This year American Artisan celebrates its fiftieth anniversary. On December 20th we will publish an anniversary issue. It's going to be a gold mine of information which you will want to file for reference. Every field covered will be represented by stories of historic interest and by articles telling about the very latest developments in the field.

NEW ITEMS *and* NEWS ITEMS

From and about the Manufacturers and Jobbers

Aeolus Dickinson Announces New Damper for Ventilator

During extreme cold weather, or during periods of high wind velocities, it is often advisable to regulate the action of roof ventilators.

The accompanying illustration shows the new design of damper for this purpose which is being supplied by Aeolus Dickinson, 3346 S. Artesian Ave., Chicago. It is placed in the throat of the ventilator just above the ceiling line and provides a quick and easy method of regulating the amount of air removed from the building.

The damper is easily controlled, counter balanced, and can be set for partial or complete closing of the ventilator by means of a ratchet attachment operated by cords. The Dickinson special damper can be supplied to fit circular or rectangular shafts and register faces can be installed if desired.

Mark J. Lacey to Manage Peck, Stow & Wilcox Sales

Mark J. Lacey has joined The Peck, Stow & Wilcox Company, Southington, Conn., and has been elected vice-president in charge of sales of that company. He was formerly with Landers, Frary & Clark, New Britain, Conn., and, previously, had been with the Corning Glass Works.

Forced Draft Fan for Domestic Heating Plants

"Sirocco Forced Draft Fans for Domestic Heating Plants" is the title of Bulletin 10,041 (A.I.A. File No. 30-G-3), issued by the American Blower Corporation, Detroit, Michigan, featuring forced draft systems to enable reduction of heating cost by the use of cheaper grades of fuel such as Buckwheat coal. These systems are designed for use with all types of steam heating boilers, hot water heaters, and warm air furnaces. Air volume is determined by hand operation of a blast gate or damper, or automatically by means of a Mercoid control.

Tables are provided for the determination of air requirements for fuel consumed, based on 10 to 12 lb. per sq. ft. of grate surface per hour for domestic heating plants with domestic Buckwheat as the fuel.

Dwight S. Richardson, of Richardson & Boynton, Dies

It is with considerable regret that we announce the very sudden death of Dwight Sumner Richardson, former Treasurer of the Richardson & Boynton Company and one of the four brothers who operated the business after the death of their father back in the eighties.

Mr. Richardson died in his eightieth year on Friday, October 10. He spent 55 years in the business working in every department, both sales and manufacturing. It was only within the last year or two that he relinquished his business activity and, even during the last year, spent some little time every week at his desk.

Mr. Richardson was the owner of innumerable patents having to do with the heating industry generally and he always took the greatest amount of interest in the development, growth and progress which the heating and plumbing industry made during the 55 years of his business life. Mr. Richardson is survived by three daughters, Mrs. Richardson having died a year or two ago.

Milcor Baseball Team Wins League Title

There were some tense moments at the Inland Steel Baseball Field when the last and most important game of the Southwestern Industrial League was played on September 6, 1930, and which won the Southwestern Pennant for the Milcor Steel Company team. Over twelve hundred cheering enthusiastic fans witnessed the game. The Milcor team was held scoreless until the fourth inning when four hits were made. The score was tied in the fifth and from then on there was a close contest, Milcor scoring the winning run in the ninth, with a score of 6 to 5.

The final standing of the various teams of the league was as follows:

	Won	Lost	Pct.
Milcor Steel Co.	10	5	.667
Globe Steel Co.	9	6	.600
Inland Steel Co.	6	9	.400
R. A. Johnston Co.	5	10	.333

Each of the Milcor players received silver cups and the team's large cup is being proudly displayed at the Milcor Steel Company, Milwaukee.

"Fan Facts" Resumes Publication

The October, 1930, issue of "Fan Facts," published by the Warm Air Furnace Fan Company of Cleveland, Ohio, is being distributed to the warm air furnace industry. In addition to inspirational material on the subject of forced air heating, the October issue begins a series of articles by J. C. Miles on "Practical Heating and Ventilating Engineering and Design." Recipients of this monthly bulletin are urged to retain their copies, as no extra supply will be provided for future distribution.

National F. & F. Co. Issues Parts Price List

The National Furnace & Foundry Company, Dalton, Ohio, has recently issued their Price List No. 18, containing repair part prices for an extensive list of furnaces and boilers, including some obsolete patterns and those of furnaces no longer manufactured.

The castings listed are made from original patterns of the National Furnace & Foundry Company to fit the various appliances named, to which new patterns are being added constantly. The manufacturers state that they have on file considerable information about furnaces and boilers that were sold under trade names of firms for whom they were manufactured.

Armco Concert Band Returns to Air

With the familiar strains of the Anvil Chorus—their signature melody—the famed Armco Concert Band returns to the air on Thursday evening, October 23, at 9 p. m., Eastern standard time, through the "Nation's Station," WLW, Cincinnati.

Every Thursday evening from 9:00 to 9:30, "The Iron Master Programs" of the Armco Concert Band will be presented by The American Rolling Mill Company, in the interest of better sheet metal products in home and industry.

An attractive folder is being sent out to announce the series of broadcasts planned for this winter.

New Attachments for Oxyweld Welding Blowpipe

Oxyweld Acetylene Company, New York, has recently introduced new accessories for the Type W-17 welding blowpipe, introduced during the past winter, which now make this blowpipe capable of doing almost any type of work which may be required of an oxy-acetylene blowpipe.

The Type CW-17 cutting attachment enables the blowpipe to do a reasonably wide range of cutting work. A long handle is used for operating the cutting oxygen valve. When this handle is not in use, it can be pulled forward parallel to the tubes so that the whole attachment may be carried around in the operator's pocket. The injector for the heating flames is contained in the attachment. At the rear of the attachment near the bottom is an adjusting screw, so that the oxygen for the heating flames may be regulated by the operator's thumb and forefinger while the blowpipe is in operation. The attachment is supplied with two cutting nozzles.

Another accessory which has just been introduced for use with the W-17 welding blowpipe is the W-17 to W-15 adaptor which makes it possible to use any of the welding heads available for the Oxyweld W-15 sheet metal welding blowpipe with the Type W-17 welding blowpipe handle. This means that the W-17 welding blowpipe may be used on work ranging from the lightest type of welding to heavy general welding work.

Agricola Team Wins Baseball Title

The team representing the Agricola Furnace Company won the title in the Tri-City Baseball League, decisively defeating the L. & N. team in the first game of a double header, the last games scheduled, to clinch the title. Agricola was one game ahead of the L. & N. team prior to the final pair of tilts, requiring only one game to retain their lead, which they did in handy fashion.

Brilliant Issues Furnace Cleaning Book

"Furnace Cleaning Made Easy and Profitable" is the title of an instructive 16-page booklet being distributed to warm air heating contractors by the Brilliant Vacuum Portland Furnace Cleaner. It is designed to help those who are now rendering vacuum cleaning service as well as those who may be contemplating doing so.

The booklet, in addition to outlining the opportunities of vacuum furnace cleaning, shows how actually to do the various cleaning jobs which are made possible with a cleaner. Several pages are devoted to pointing out "How to Get

Profitable Furnace Cleaning Business" through advertising, telephone calls, personal calls, house-to-house canvassing, and through co-operation with coal dealers. The center spread is devoted to reproductions of newspaper and direct mail advertising material which has been successfully employed to get furnace cleaning business.

Stanley Electric Co. Introduces New Unishear

The Stanley Electric Company of New Britain, Conn., are now selling a new and larger Unishear known as Type B. It has been named, by some, the big brother to the "Mighty Midget" because the cutting principle is very similar. However, the similarity stops there. Type "B" has a cutting capacity up to 3/4-in. boiler plate. Mighty Midget cuts up to 18 U. S. gauge hot rolled steel. Type "B" 36-in. throat weighs about 5500 lbs., whereas Mighty Midget weighs only 6 1/2 lbs.

Type "B" will cut at a speed up to 10 ft. per minute depending on how fast the operator wants to guide the sheet through the shears. It is also possible to cut any desired curve and to cut complete circles with a minimum radius of 6 in. on 3/4-in. material and even less than 3-in. radius on lighter material. It can cut or trim the edges of flat stock to within less than the thickness of the sheet.

Type "B" Stanley Unishear can be made for either motor or belt drive. If a motor is desired it can be built into the machine, making a complete unit. A 2-h.p. motor is all that is required.

The Stanley Electric Tool Company, New Britain, Conn., has prepared a booklet that tells what the machine will do and describes in detail the construction of this unique machine.

Minneapolis-Honeywell Adopts Radio Publicity

In commenting on the campaign of the Minneapolis-Honeywell Regulator Company, manufacturers of automatic heat regulators and controls, to carry the message of automatic heat to radio listeners, C. B. Sweatt, vice-president, Minneapolis-Honeywell Regulator Company, stated:

"The adoption of a radio campaign was prompted in a large measure by the desire to carry the message of automatic heat into the millions of homes which could be reached through this medium. It was felt that an outstanding musical program comparable to the leading radio advertisers could best accomplish this purpose.

"The Minneapolis Symphony Orchestra," said Sweatt, "rated by music critics as one of the five leading symphonies in

the world, was then selected. The reception of the first two programs has more than substantiated our hopes. With the universal acceptance of the musical programs assured, it is impossible to estimate the far-reaching effects of these weekly messages to millions of listeners on the value of automatic heat." The Minneapolis-Honeywell Regulator Company is said to be the first national advertiser in the heating specialty field to employ radio advertising.

Armco's Pattern Drafting Course in Book Form

The series of articles on pattern drafting which have been running in *Ingot Iron Shop News* during 1929 and the first part of 1930 have now been compiled in booklet form. The lessons run consecutively through the book just as they ran in the *News*.

This series was written by Martin J. Raubenstraw, instructor of the Sheet Metal Department, Carnegie Institute of Technology.

This booklet will be sent free to any contractor writing American Rolling Mill Company, Middletown, Ohio.

St. Louis Technical Institute Has Catalogue of Courses

The St. Louis Technical Institute of St. Louis will send to anyone interested in home study courses their newest catalogue which describes in detail all the courses the institute now offers.

According to the catalogue the school will now train in courses in Sheet Metal Design and Drafting, Blower, Ventilating, Exhaust and Blower Work, Business Administration, Heating and Ventilating, Steam and Hot Water Work, Air Conditioning, Fan Work, and other short courses.

Anyone interested in taking one of these courses or wanting to get full details on any course can get full information by writing for the catalogue. Full details on the course of any course or a group of courses can also be secured from the institute.

Special Notice—Hot from Our Wire Service

Word has just reached us by telegraph from our correspondent in Columbus, Ohio, that Arthur Lamnech was elected to Congress in the big Democratic landslide which swept the country last Tuesday.

Congratulations.

What this country needs is more furnace men in Congress, now that we've got that good five cent cigar we've been hollering about so many years.

Determine Heat Requirements with Speed and Accuracy

with Allen's Standard Code Computing Charts

HERE at last is a really simple and accurate method of quickly figuring Standard Code heating requirements in any building. After taking room, wall and glass measurements, all you need do is consult the proper charts and total the result for your basement pipe areas, with little chance for error.

WALL DIMENSIONS & SQUARE FEET
LINEAL FEET OF WALL

2	3	4	5	6	7	8	9	10	11	12	13	14	15
18	24	30	36	42	48	54	60	66	72	78	84	90	96
108	144	180	216	252	288	324	360	396	432	468	504	540	576
648	864	1080	1296	1512	1728	1944	2160	2376	2592	2808	3024	3240	3456
432	576	720	864	1008	1152	1296	1440	1584	1728	1872	2016	2160	2304
288	384	480	576	672	768	864	960	1056	1152	1248	1344	1440	1536
192	256	320	384	448	512	576	640	704	768	832	896	960	1024
128	171	214	257	300	343	386	429	472	515	558	601	644	687
84	112	140	168	196	224	252	280	308	336	364	392	420	448
56	74	92	110	128	146	164	182	200	218	236	254	272	290
36	48	60	72	84	96	108	120	132	144	156	168	180	192
24	32	40	48	56	64	72	80	88	96	104	112	120	128
16	21	26	32	37	43	48	53	58	63	68	73	78	83
10	13	16	20	23	27	30	33	36	39	42	45	48	51
6	8	10	12	14	16	18	20	22	24	26	28	30	32
4	5	6	8	9	10	11	12	13	14	15	16	17	18
3	4	5	6	7	8	9	10	11	12	13	14	15	16
2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	2	3	4	5	6	7	8	9	10	11	12	13	14

1. "WALL DIMENSIONS AND SQUARE FEET CHART No. 1"

(repeated in Part 2)

has been provided to eliminate the time of calculating the square feet of wall. The foot note gives instruction for using this chart.

NET WALL CHART

IMPORTANT NOTE: Chart #4 (cubic contents), chart #6 (glass) should be consulted and results totaled to find net wall in square feet.

10 to 44	45 to 79	80 to 114
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
28	29	30
31	32	33
34	35	36
37	38	39
40	41	42
43	44	45
46	47	48
49	50	51
52	53	54
55	56	57
58	59	60
61	62	63
64	65	66
67	68	69
70	71	72
73	74	75
76	77	78
79	80	81
82	83	84
85	86	87
88	89	90
91	92	93
94	95	96
97	98	99
100	101	102
103	104	105
106	107	108
109	110	111
112	113	114

3. "NET WALL CHART No. 3"

(Pages 7 to 11, incl.)

After making all the glass deductions, this chart gives the net wall in square feet, factor, pipe area, for first, second and third floors, in square inches of piping.

"EXPOSED WALL CHART No. 1"

(Pages 2 to 36, Part 2)

are for use instead of "Net Wall Charts" where walls are not of standard construction (frame wall containing siding, paper, sheathing, studding, lath and plaster and factor 60 used) or where floors or ceilings are exposed. 35 Tables of different construction—wall, ceiling, floor and insulation. By considering the construction of the building, the Engineer will be able to make a great many sales which he would not otherwise, if he dwells particularly on the type of construction as contrasted with a competitor who figures all buildings the same, regardless of the type of construction.

With this book of charts, men of little experience in the heating business are able to estimate reliably. Salesmen can determine the proper furnace and pipe sizes within from three to five minutes. The thoroughness and accuracy of this method inspires the confidence of the prospect in your recommendations, thus reducing sales resistance and eliminating low price competition.

Many have established fine sales records with the help of this book and are enthusiastic about it. After you have used it on only one job you will never part company with it.

GLASS CHART

IMPORTANT NOTE: Chart #4 (cubic contents), chart #6 (glass) should be consulted and results totaled.

14x20	14x20.5	14x21
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
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90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

2. "GLASS CHART No. 2"

(Pages 2 to 6, incl.)

gives glass surfaces from 1x1 to 10 1/2 x 15, inclusive, with square feet, factor, pipe area, for first, second and third floors, in square inches of piping.

CUBIC CONTENTS CHART

IMPORTANT NOTE: Chart #4 (cubic contents), chart #6 (glass) should be consulted and results totaled to find net wall in square feet.

14x20	14x20.5	14x21
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
24	24	24
25	25	25
26	26	26
27	27	27
28	28	28
29	29	29
30	30	30
31	31	31
32	32	32
33	33	33
34	34	34
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72	72	72
73	73	73
74	74	74
75	75	75
76	76	76
77	77	77
78	78	78
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82	82	82
83	83	83
84	84	84
85	85	85
86	86	86
87	87	87
88	88	88
89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

4. "CUBIC CONTENTS CHART No. 4"

(Pages 12 to 48, incl.)

enumerates room dimensions beginning with 4x4 to 4x30, inclusive, and continuing in numerical progression until the room size of 20x30 is covered. The object of the small dimensions is to take care of sun porches, halls, and irregular room sizes. In these pages, with a given dimension, the following information is indicated: ceiling height, cubic contents, factor and pipe area for first, second and third floors in square inches of piping.

It Will Cost You Nothing—

to inspect and try this valuable book in use. Just sign and mail the coupon and pay the postman \$5.00 on delivery. If you do not want to keep it we shall cheerfully refund your money.

Mail This Coupon Today!
You Will Not Regret It.

Book Dept., AMERICAN ARTISAN
139 N. Clark St., Chicago, Ill.

Send me on approval a copy of Allen's Standard Code Computing Charts, for which I will pay the postman \$5.00 on delivery. If after using the charts I do not find the book worth the price to me, I will return it in good condition and you will refund my money.

NAME.....
ADDRESS.....
TOWN.....
STATE.....

JUNE-AIRE HEATING SYSTEM

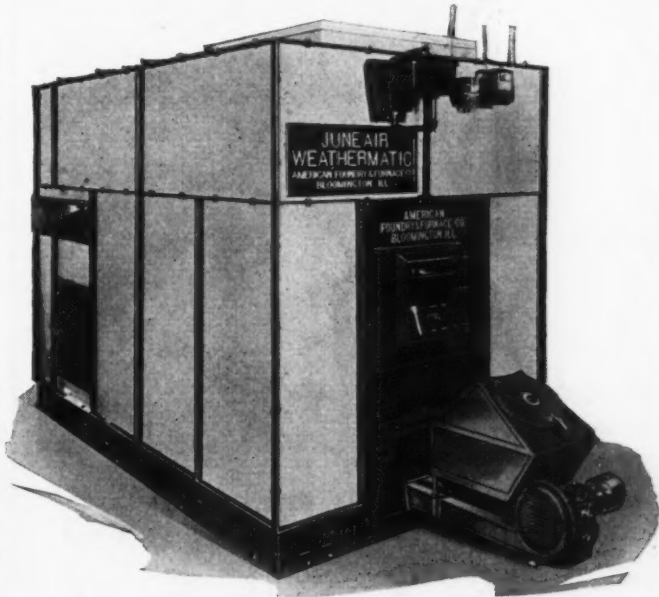
"MAKES JUNE WEATHER AUTOMATICALLY"

THE June-Aire Heating System is a complete heating, ventilating, and air conditioning machine for homes, theatres, schools, churches, garages, etc. The built-in blower forces air positively to every part of the building. The automatic humidifier provides ample moisture. Automatic temperature control is an integral part of the unit. Built-in filters clean the air effectively.

June-Aire offers the dealer unique sales advantages such as:

- a. Air cleaning.
- b. Wholly dependable heat delivery.
- c. An attractive square cased unit, in colors, that can be located anywhere in the basement without regard to long runs of pipe.
- d. A chance to sell the jobs that usually go to radiator heat.
- e. A complete system for every size job—and for any fuel—gas, coal or oil.

American Bloomington Standardized Engineering enables you to figure Blower Furnace jobs quickly and easily. Write for our special dealer proposition



JUNE-AIRE WITH COAL STOKER

AMERICAN FOUNDRY & FURNACE COMPANY
BLOOMINGTON, ILLINOIS

To you as an important member of our industry AMERICAN ARTISAN extends a cordial invitation to participate in and enjoy the program in commemoration of the completion of our Fifty Golden Years of Service to the warm air heating and sheet metal industry and which will be celebrated on December 20th in our

50th ANNIVERSARY

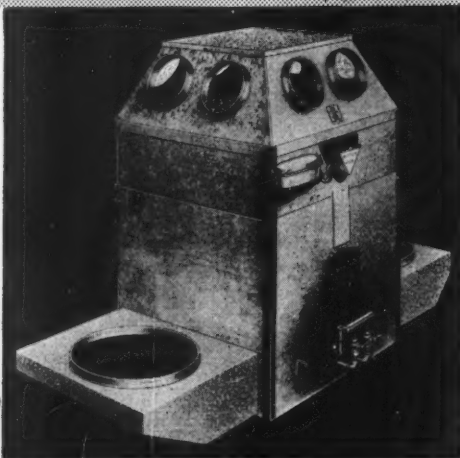
WARM AIR FURNACE ANNUAL

This Anniversary Number and Annual will carry to thousands of furnace and sheet metal men information and announcements that will open the way to a year of progress and prosperity. It will find a permanent place in the libraries of the live men in the industry. You are cordially and most sincerely invited to become a part of it.

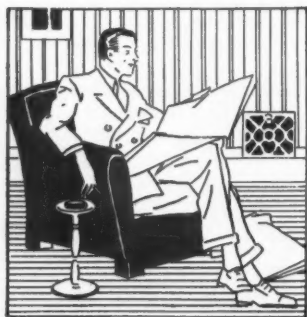
Mention AMERICAN ARTISAN in your reply—Thank you!

PAYNE

GAS-FIRED
VENTED



CENTRAL HEATING SYSTEM



Now you can compete in installation cost with the average old fashioned liquid or solid fuel plant.

More than that, Payne Central Furnaces set a new standard of performance! They provide a degree of heating luxury never before achieved!

You can make more profits this year by concentrating your efforts on one line...Payne!

You enjoy full cooperation from the largest installing organization of its kind in the world.

This is going to be a "big year" in gas heating. Why waste time representing "second bests". Tie up with the leader. Write now for proposition.



**PAYNE FURNACE
& SUPPLY CO., INC.**
Beverly Hills, California

Warehouse—Buffalo, N. Y. • Jobbing Connections in Principal Cities
Dealers Everywhere

There's a Payne Heat System for Every Climate and Building

"Just the Answer"

*For the large Residence, Church,
Store, School heating jobs*



**No. 33 and No. 36 ROUND OAK
Moistair Boiler-Plate Furnaces**

*Your orders can be filled promptly—
wire, phone or write us*

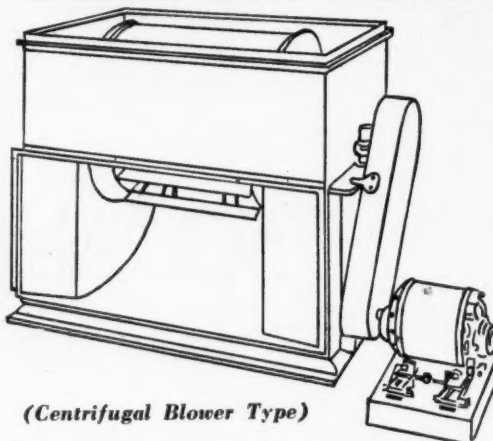
THE BECKWITH COMPANY

Leaders in Healthful Heating Since 1871

Dowagiac

Michigan

SILENTAIR FURNACE FANS



(Centrifugal Blower Type)

COMPACT—SILENT—ECONOMICAL

The "SILENTAIR" centrifugal fan is the only type of furnace fan that will move air against pressure without noise. "Silentair" Fans and Air Washers assure perfect air, temperature, purity and humidity control.

Write for Illustrated Literature

A. GEHRI & CO., INC.

Tacoma

Established 1892

Washington

Say you saw it in AMERICAN ARTISAN—Thank you!



MASTER
HEAT REGULATOR
Type 22
FULL ELECTRIC

*Sell it when you
sell the furnace!*

EVERY home owner wants the convenience—the added comfort from UNIFORM heat and the fuel savings accomplished by this dependable, automatic janitor, the MASTER Heat Regulator.

Full Electric;
8-Day Jewelled
Clock, \$80

Sell it when you sell the furnace—you increase the owner's satisfaction and add substantially to your profit on every deal.

The MASTER acts instantly upon changes of one degree, or less if desired. Full electric—no hand-operated devices to forget.

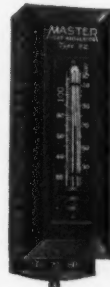
Flawless construction—long life—dependable service. Made by the manufacturers of the MASTER Gradual Operation Heat Regulator.

Good-sized profits are waiting for dealers who handle the Master.

Write for details

White Mfg. Co.

2362 University Avenue, St. Paul, Minnesota



Full Electric,
without clock
control, \$55

**Cash in on Oil Burner
Sales Opportunity
with the BERRYMAN**



A
Quality
Burner
for only
\$139.50
complete
with all
Controls
F.O.B.
Chicago

IF you act promptly to secure the Berryman franchise you can enjoy extra profits you are missing now, with little additional effort. Every customer—new or old—is a prospect for a Berryman. Each installation will sell several more.

The Berryman Rotary Oil Burner is a marvel of simplicity. There are only two moving parts. It is easily installed in any type of furnace and is just as easily removed for inspection without disconnecting a single part.

Fully automatic in operation; economical; silent; nothing to get out of order. Guaranteed for two years, will give a life time of service.

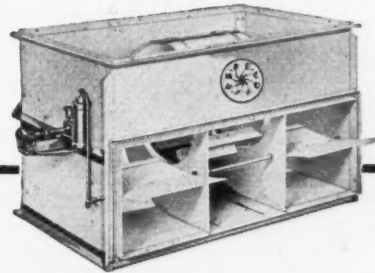
Let us tell you more about our attractive dealer proposition

Berryman System of Oil Heating, Inc.

Successful Manufacturers, Wholesalers and Retail
Distributors of Oil Burning Equipment Since 1918

1300 West Washington Boulevard, Chicago

Fully Balanced Distribution of Air with the AM-PE'-CO



PATENTED features of the Am-Pe'-Co design make it the only blower providing fully balanced distribution of air to both air inlets. Its non-leaking ring oil bearings insure quiet and efficient operation.

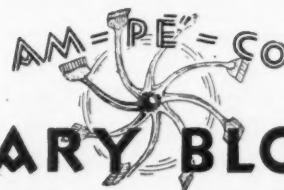
With the Am-Pe'-Co Rotary Blower you can approach any warm air heating problem with full assurance that you can provide positive circulation of air to every room. The Am-Pe'-Co is positive in operation and absolutely automatic. The Blowers are built with or without dampers which open automatically simultaneously with the stopping of the blowers, permitting gravity circulation when conditions require such an installation.

With true forced air circulation the advantages of warm air heating and air conditioning are made available to large residences—to a class of home owners who can pay for the best.

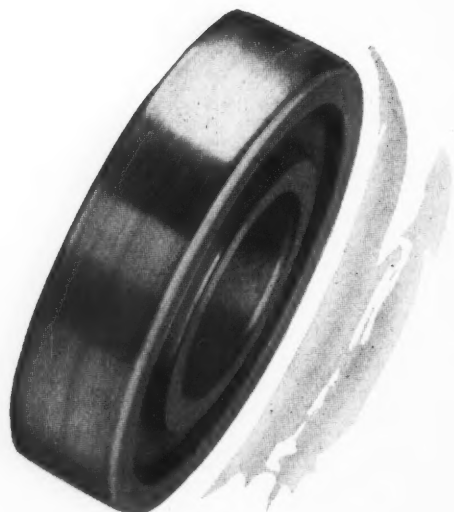
Are you going after this class of business? Are you getting your share?

Let us tell you more about the
Am-Pe'-Co construction features and
start going after the profitable jobs
which it makes possible.

American Machine Products Company
Marshalltown, Iowa



ROTARY BLOWER



More SILENT *than the moving air!*

"AIR NOISE" is the only audible sound, when a fan or blower runs on Fafnir Ball Bearings. And the quietness that Fafnirs provide is lasting, for silence and freedom from friction go hand in hand.

Deep races—large balls and more of them—tough, wear-proof alloy steel—races and balls that are hardened throughout! These are some of the features that practically banish friction and wear in Fafnir Ball Bearings.

Maintenance consists merely of greasing once or twice a year. No other attention is needed to obtain full bearing protection and enduring silence, when Fafnirs carry the load.



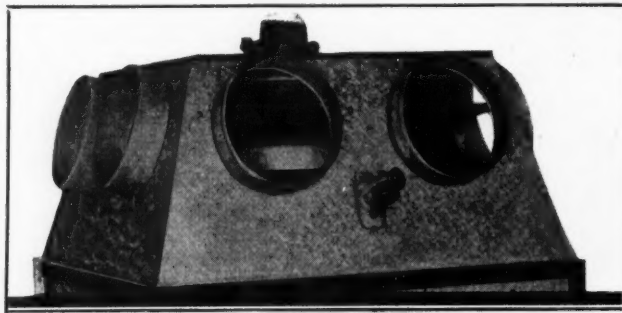
THE FAFNIR BEARING COMPANY
NEW BRITAIN, CONN.

New York—Chicago—Milwaukee—Detroit—Newark
Atlanta—Dallas—Cleveland—Philadelphia

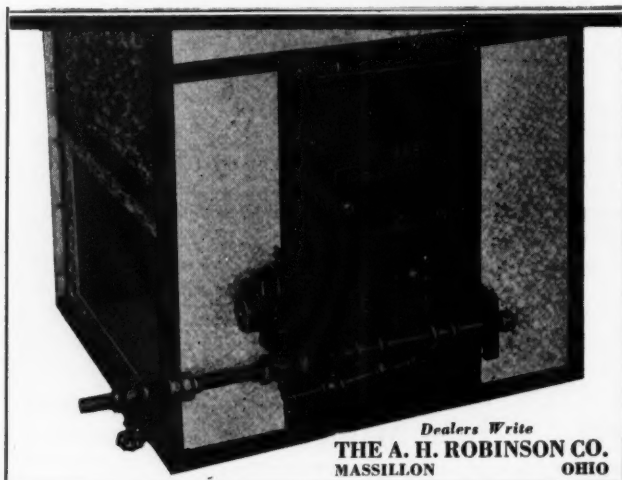
FAFNIR

BALL BEARINGS

Say you saw it in AMERICAN ARTISAN—Thank you!



THE ROBINSON "FORC-AIR"
GAS FURNACE



Dealers Write
THE A. H. ROBINSON CO.
MASSILLON OHIO

Be a Manufacturer—

Make the profits in your territory
that we make in ours with exclusive
rights to our patents—

One sheet metal contractor in every county can manufacture our patented product with full protection as to patent rights and territory.

This right is all you buy.

The product is manufactured right in your shop—it is very successful and every territory is ripe with many prospects.

You can make big profits operating and manufacturing just as we do—there is no obligation in writing for full details.

THIS IS A VERY UNUSUAL OPPORTUNITY—
YOU MUST ACT AT ONCE BEFORE THE TERRITORY RIGHTS FOR YOUR COUNTY ARE AWARDED.

Address F-526, care of

AMERICAN ARTISAN

139 North Clark St.

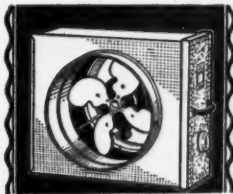
Chicago, Ill.

**Greatest Air Moving Efficiency
at the Lowest
Cost--that's what
you provide with**

A-C
*Thermostatically
Controlled*
**Automatic
HEAT BOOSTER**

WHEN you install one of these fans in either a new or existing warm air furnace installation, you can assure your customer that you are giving him the greatest possible air moving efficiency for the money—only a small fractional part of the cost of the furnace itself.

This fan is quiet, efficient and powerful. It can be quickly installed in any furnace by using an elbow or two and a couple of lengths of pipe. It effectively accelerates the movement of air. The Mercury Control makes it fully automatic—a feature not found on any other fan near the A-C price.



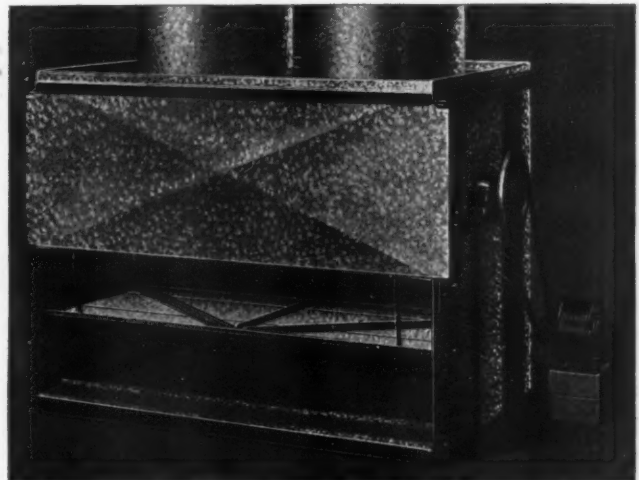
The No. 9 size Unit with 10 inch air outlet, is designed for small homes. Equipment includes Mercury Control, Heat Booster, Fan and Unit Housing complete and ready to install for only (to the dealer) **\$36**

No. 12 with 12 inch fan and 14 inch opening, \$48.00.

*Order from your jobber or write direct
for complete details*

A-C MANUFACTURING COMPANY
417 Sherman Avenue ~ ~ Pontiac, Illinois

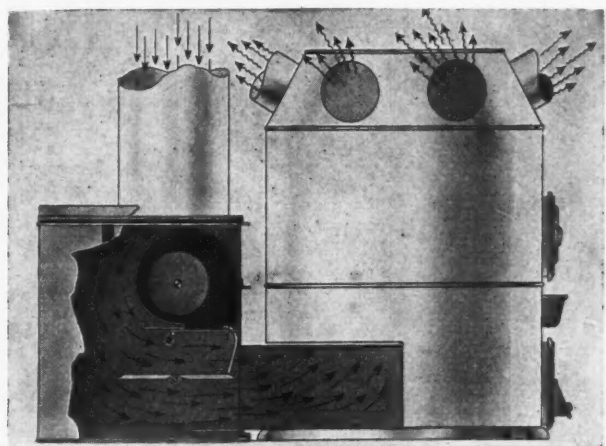
BRUNDAGE FORCED AIR SYSTEM



Outlet side of the new Brundage Forced Air System showing closed position of damper when fans are operating.

THE new Brundage Forced Air System is compact, silent and economical. Developed for increasing the efficiency of any make of warm air heating equipment. Heating contractors everywhere are finding it a real sales success.

More Dealers are wanted. Write today for details of our profitable dealer proposition.

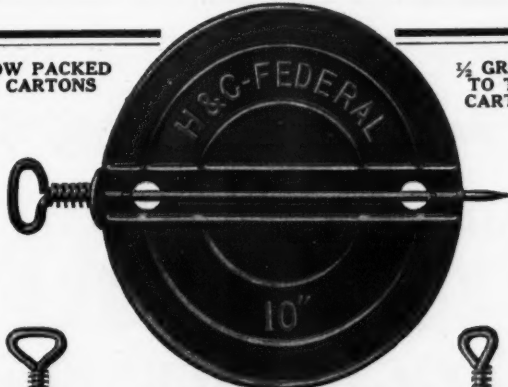


Side view, cut open to show dampers closed by air pressure from fans. Note direction of air currents forced through Brundage System and furnace.

The Brundage Company
KALAMAZOO, MICHIGAN

NOW PACKED
IN CARTONS

1/2 GROSS
TO THE
CARTON



A FINE DAMPER Attractively Priced

FORMERLY sold under the trade name "STAR," this steel damper has been very popular for years. It is exceptionally well made. Handle enters either side of disc. Furnished in 6", 7", 8", 8 1/2", 9", 10", 12" and 14" sizes.

Samples and prices on request
**STURDY—ECONOMICAL
No-Rivet Clips and Tips**
Made of heavy gauge steel. Prongs provide quick and secure means of fastening to disc without rivets. Also punched with rivet holes.



No. 101 Clip



No. 102 Clip

*It pays to standardize on the H & C line of
Quality Furnace Accessories*

HART & COOLEY MFG. CO.

Successors to Federal Mfg. Company

SALES OFFICES:

Chicago, 61 W. Kinzie St.; Philadelphia, 1600 Arch St.; New York, 101 Park Ave.; Boston, 75 Portland St.; New Britain, Nashua, N. H.—FACTORY AT HOLLAND MICHIGAN

Mention AMERICAN ARTISAN in your reply—Thank you!

"Old Wine in New Bottles"

Replace Those Obsolete and Worn Out Heating Plants with the Improved



LONDON BOILER PLATE FURNACES

*They Are Cold Riveted and Welded
Smoke, Gas and Fume Tight*

*They Have Balanced Heat Surfaces
Which Mean Efficiency and Economy*

*Are Equipped with Either Duplex Bas-
ket Dump, Triangular or Draw-Center*

GRATES

AND

RADIATORS

FOR

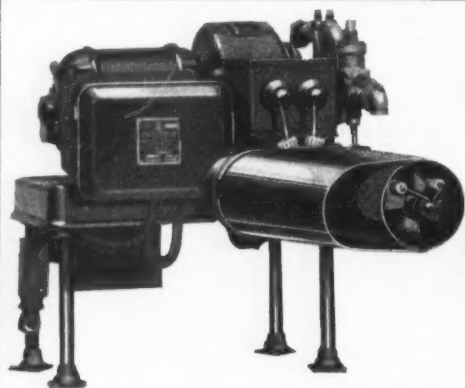
SOFT OR HARD COAL, COKE OR OIL

THE LONDON FURNACE CO.

LONDON, OHIO

THOS. W. PEARSON—Sales Manager

*They Cost No More Than the Troublesome Kind.
Prompt Shipment Guaranteed.*



Now — \$74 Less for This 1931 Model BETTENDORF AUTOMATIC OIL BURNER

Listed by the Underwriters Laboratories

*Proved under every heating condition to be a perfect
type burner for warm air plants*

Six models. Capacities 1½ to 13 gals. per hour

**NEW
DEALER'S
PRICE**

\$159⁷⁵

**FORMER
PRICE
\$234**

NOTE THESE FEATURES: Webster Transformer, Cuno Oil Filter, Minneapolis Honeywell Controls, Detroit Lubricator, Pressure Regulating Valves, Century Motor, Tuthill Pressure Pump, Webster Radio Filter.

WRITE TODAY FOR FULL DETAILS OF OUR 30 DAY TRIAL ORDER

BETTENDORF MFG. CO., BETTENDORF, IOWA

Say you saw it in AMERICAN ARTISAN—Thank you!

How Are Your Prospects for Winter Business?

They Are Good for Dealers Who Feature the "AFCO" Duo-Blo Industrial Unit Heater

WITH residential building at the usual winter standstill, and home heating plant replacements slowed down to a walk, you must find some other source for your winter profits. Here it is.

"AFCO" Dealers have found the "AFCO Duo-Blo" Industrial Unit Heater just the thing needed to keep them busy, as it opens an entirely new market. It sells readily to schools, churches, garages, filling stations, stores, shops, factories, etc. There are many live prospects in your town now, so act quickly. There is no time to lose—start selling "AFCO" systems at once.

*Write or Wire for the
"AFCO" Proposition*

AMERICAN FURNACE CO.

2719-31 Morgan Street

St. Louis

Missouri



What IS "Air Conditioning"?

It Is { HUMIDIFICATION
AIR MOTION
PURIFICATION

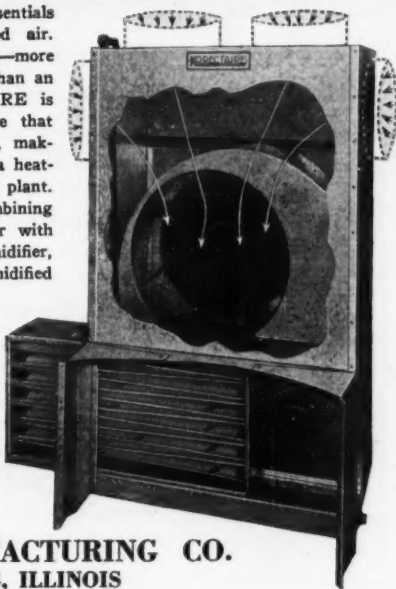
KORECTAIRE
The CORRECT AIR MACHINE

—combines these three essentials for healthfully conditioned air. It is more than a blower—more than a humidifier—more than an air washer. KORECTAIRE is the one complete machine that does this three-in-one job, making any warm air heater a heating and air conditioning plant. It is a compact unit, combining a positive pressure blower with an air washer and humidifier, circulating cleansed, humidified warm air.

Write for agency details now—

Right now you need the Korectairste on your sales floor—you need it to close the bigger jobs and to make better profits. Send today for illustrated circular and prices.

WATT MANUFACTURING CO.
STERLING, ILLINOIS



BRILLION FURNACES

HIGH VALUE
+ LOW COST
= LONG PROFIT

UNLESS you are a Brillion dealer it will be difficult to believe that a furnace of the extraordinary quality of the Brillion could sell at such a low price.

You will have no trouble selling your customers quality installations and at an attractive price, too, when you feature the Brillion.

The quality features of the Brillion will be apparent to prospects who see it on your sales floor.

**PROMPT
SHIPMENT OF
ALL SIZES**

Mail This Coupon TODAY

BRILLION FURNACE CO.
200-300 Park Ave., Brillion, Wis.

Send me full details and Catalog No. 60.

Name.....

Address.....

Town.....

State.....

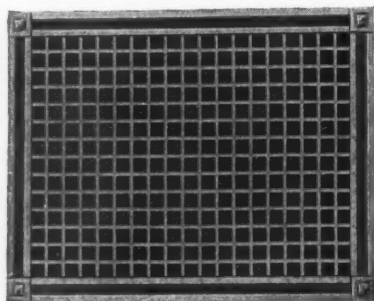


Mention AMERICAN ARTISAN in your reply—Thank you!

Grilframe

(Trade Mark)

THE NEW GRILLE CONSTRUCTION

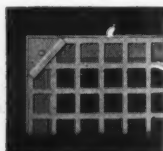
Beautiful—Convenient—Economical

"Grilframe" parts
ready for assembly
(Front view)

"GRILFRAME"
is completely assembled
from stock parts. This
new method makes pos-
sible 48 hour service

Distributors are being ap-
pointed in principal cities

SEND FOR CATALOG



Grille secured to
frame with lug
(Back view)

H & K GRILLES

H & K grilles are well known through-
out the country and for excellence of
workmanship and beauty of design are not
surpassed. Grilframe construction is adapted
to all of H & K grille designs and rounds
out the line of our punched metal grilles.
Ask for catalog No. 28.

PERFORATED METAL

EVERY type of perforated metal from
the finest to the largest standard sizes
are within the scope of our equipment. This
means round, oblong, slot, square holes and
many special shapes suitable for metal of
different kinds and thicknesses.

*Write us for perforated metal
of every sort*

THE HARRINGTON & KING PERFORATING COMPANY

5649 Fillmore Street Chicago, Ill.

New York Office: 114 Liberty Street



An Emblem of Quality

The dealer who has never sold
Torrid Zone steel furnaces has
no conception of the many ad-
vantages this furnace line of-
fers. To say you are familiar
with Torrid Zone construction
is not enough. There are, free
engineering service, newspaper
and dealer help advertising,
financial aid, an unusual va-

riety of furnace sizes, quick
deliveries made possible by
large warehouse stocks, and a
score of other Torrid Zone
service features of vital inter-
est to every furnace dealer. Why
not investigate for yourself Tor-
rid Zone possibilities. Write for
complete information on the
Torrid Zone line.

LENNOX FURNACE COMPANY, INC.

Marshalltown, Iowa Syracuse, N. Y. Toronto Winnipeg

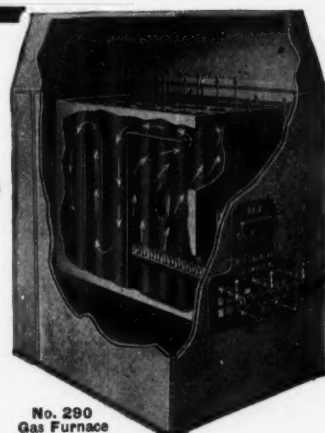
REX Gas FIRED Furnaces

The Rex with its tubular
construction has more than
twice the amount of radiation
than many other furnaces.

They are designed to burn
gas economically and efficiently,
the white arrows show the long
fire travel to flue.

Write today for literature

CALKINS & PEARCE
205 E. Long St., Columbus, O.
"Gas Furnaces since 1893"



No. 290
Gas Furnace

You can assure your customers 35
to 55% relative humidity with the

FARRIS WATERBASE FURNACE

Write for full details today

FARRIS FURNACE COMPANY

SPRINGFIELD

Established 1899

ILLINOIS

**A Well Rounded, Profit-
Making line for the Warm-
Air Heating Contractor—**

Vernois

**FURNACES, CABINET CIRCU-
LATORS and GAS RANGES**

Write for complete catalog

MT. VERNON FURNACE & MFG. CO.
Mt. Vernon, Ill.

~ MARKET QUOTATIONS ~

AMERICAN ARTISAN is the only publication quoting Prices on Metals, Sheet Metal Equipment and Supplies, Warm Air Heating Supplies and Accessories, corrected bi-weekly. These quotations are not guaranteed but are obtained from reliable sources and reflect nation-wide market conditions at the time of going to press.

NOTE—These prices are Chicago Warehouse Prices to which must be added territory differentials

METALS

PIG IRON

Chicago Fdy..	
No. 2	\$17.50
Southern Fdy. No. 2	\$17.01 to 18.01
Lake Superior Charcoal	27.04
Malleable	17.50

FIRST QUALITY BRIGHT CHARCOAL TIN PLATES

IC	20x28	112 sheets	\$22.50
IX	20x28		25.50
IXX	20x28	56 sheets	14.50
IXXX	20x28		15.50
IXXXX	20x28		17.00

TERNE PLATES

		Per Box
IC	20x28, 40-lb.	112 sheets \$24.00
IX	20x28, 40-lb.	112 sheets 26.50
IC	20x28, 25-lb.	112 sheets 20.50
IX	20x28, 25-lb.	112 sheets 23.50
IC	20x28, 20-lb.	112 sheets 19.00
IX	20x28, 20-lb.	112 sheets 22.00

"ARMCO" INGOT IRON PLATES

No. 8 ga.	—110 lbs.	\$4.15
3/16 in.	—100 lbs.	4.05
1/4 in.	—100 lbs.	3.85

COKE PLATES

Cokes, 80 lbs., base, 20x28	\$12.00
Cokes, 90 lbs., base, 20x28	12.20
Cokes, 100 lbs., base, 20x28	13.75
Cokes, 107 lbs., base, IC,	
20x28	12.75
Cokes, 135 lbs., base, IX,	
20x28	14.75
Cokes, 155 lbs., base, 2X,	
56 sheets	8.50
Cokes, 175 lbs., base, 3X,	
56 sheets	9.35
Cokes, 195 lbs., base, 4X,	
56 sheets	10.25

BLUE ANNEALED SHEETS

Base 10 ga.	per 100 lbs.	\$8.35
"Armco" 10 ga.	per 100 lbs.	4.15

ONE PASS COLD ROLLED BLACK

No. 18-20	per 100 lbs.	\$3.75
No. 22	per 100 lbs.	3.70
No. 24	per 100 lbs.	3.75
No. 26	per 100 lbs.	3.85
No. 27	per 100 lbs.	3.90
No. 28	per 100 lbs.	4.00

GALVANIZED

No. 16	per 100 lbs.	\$3.85
No. 18	per 100 lbs.	3.95
No. 20	per 100 lbs.	4.15
No. 22	per 100 lbs.	4.20
(Standard differentials on extras to apply)		
No. 24	per 100 lbs.	\$4.35
No. 26	per 100 lbs.	4.60
No. 27	per 100 lbs.	4.70
No. 28	per 100 lbs.	4.85
"Armco" 24	per 100 lbs.	5.95

BAR SOLDER

Warranted 50-50	per 100 lbs.	\$19.00
45-55	per 100 lbs.	17.50
48-52	per 100 lbs.	18.00
Plumbers'	per 100 lbs.	15.50

ZINC

In Slabs	\$5.00
----------	--------

SHEET ZINC

Cask Lots (600 lbs.)	\$12.00
Sheet Lots (100 lbs.)	13.00

BRASS

Tubing, brazed, Chicago base	24 1/2 c
Sheets, Chicago base	16 1/2 c
Tubing, seamless, Chicago base	21 1/2 c
Wire, Chicago base	17 1/2 c
Rods, Chicago base	14 1/2 c

COPPER

Sheets, Chicago base	19 1/2 c
Tubing, seamless, Chicago base	21 1/2 c
Wire, plain rd., 8 B. & S. Ga. and heavier	11 1/2 c

LEAD

American Pig	\$6.00
Bar	7.50

TIN

Bar Tin	per 100 lbs. \$32.00
Pig Tin	per 100 lbs. 31.00

SHEET METAL SUPPLIES, WARM AIR FURNACE FITTINGS AND ACCESSORIES

ASBESTOS

Paper up to 1/16	6c per lb.
Roll board	7 1/2 c per lb.
Mill board 3/32 to 1/2	7 1/2 c per lb.
Corrugated paper (250 sq. ft. per roll)	\$6.00 per roll

ASBESTOS SEGMENTS

8 in.	per 100 sets \$7.30
9 in.	per 100 sets 8.80
10 in.	per 100 sets 9.30
12 in.	per 100 sets 10.50

CEMENT FURNACE

5-lb. cans, net	\$0.40
10-lb. cans, net	0.80
25-lb. cans, net	2.00
Per 100 lbs.	7.50

CLIPS

Damper	
No-Rivet Steel, with tail pieces, per gross	\$9.50
Rivet Steel, with tail pieces, per gross	7.50
Tail pieces, per gross	2.40

COPPER FOOTING

Copper Footing	41%
----------------	-----

CORNICE BRAKES

Chicago Steel Bending	
No. 1 to 6B	Net

CUT-OFFS

Cal., plain, round or cor. rd.	
26 gauge	30%
28 gauge	35%

DAMPERS

Yankee Warm Air	
7 inch, doz.	\$1.60
8 inch, doz.	2.20
9 inch, doz.	2.60
10 inch, doz.	2.80
12 inch, doz.	3.50
14 inch, doz.	5.00

EAVES TROUGH

Galv. Crimped, crated	75-10%
Zinc	60%

ELBOWS

Conductor Pipe	
Galv. plain or corrugated, round flat Crimp.	
28 gauge	60%
26 gauge	45%
24 gauge	15%

Galv. Terne Steel

Plain Rd. and Rd. Corr.	
28 gauge	60%
26 gauge	45%
24 gauge	15%

Square Corrugated

28 gauge	50%
26 gauge	35%

Portico Elbows

Standard Gauge Conductor Pipe, plain or corrugated.	
Not nested	70 & 5%
Nested solid	70 & 5%

Sq. Corr., A. & B. & Octagon

28 gauge	50%
26 gauge	35%

Portico

1, 1 1/4, 1 1/2 inch	45%
----------------------	-----

Copper

16 oz. all designs	50%
--------------------	-----

Zinc

All styles	60%
------------	-----

ELBOWS—Stove Pipe

1-piece Corrugated, Uniform Blue	
No. 28 Gauge.	Doz.
5 inch	\$1.15
6 inch	1.25
7 inch	1.75

Adjustable—Uniform Blue

No. 28 Gauge, Uniform Blue.	
5 inch	\$1.60
6 inch	1.75
7 inch	2.10

WOOD FACES—60% off list.

FIRE POTS

No. 02 Gasoline Torch, 1 qt.	\$5.13
No. 9250, Kerosene, or Gasoline Torch, 1 qt.	6.50
No. 10 Tinner's Furnace	
Square tank, 1 gal.	11.20
No. 15 Tinner's Furnace	
Round tank, 1 gal.	10.70
No. 21 Gas Soldering Furnace	8.00
No. 110 Automatic Gas Soldering Furnace	10.50

GLASS

Single and Double Strength, A, all brackets	85%
Single and Double Strength, B, all brackets	87%

HANGERS

Conductor Pipe	
Milcor Perfection Wire	25%
Milcor Triplex Wire	16%

Eaves Trough

Steel (galv. after forming) from list	45%
Selflock E. T. Wire, list	10%

HOOKS

Conductor	
"Direct Drive" Wrought Iron for wood or brick	15%

MITRES

Galvanized Steel Mitres	
28 gauge	70
26 gauge	60-20

PASTE

Asbestos Dry Paste

200-lb. barrel	\$15.00
100-lb. barrel	7.75
50-lb. pail	4.50
25-lb. pail	2.50
10-lb. bag	1.20
5-lb. bag	0.60

PIPE

Galvanized

Crated and nested (all gauges)	75-7 1/2 %
Crated and not nested (all gauges)	75-2 1/2 %

Furnace Pipe

Double Wall Pipe and Fittings	60%
Single Wall Pipe, Round Galvanized Pipe	60%
Galvanized and Tin Fittings	60%

Lead

Per 100 lbs.	\$12.50
Stove Pipe	
"Milcor" "Titelock" Uniform Blue	
Stove	
28 gauge, 5 inch U. C.	
nested	\$11.00
28 gauge, 6 inch U. C.	
nested	12.00
28 gauge, 7 inch U. C.	
nested	14.00
30 gauge, 5 inch U. C.	
nested	10.25
30 gauge, 6 inch U. C.	
nested	11.00
30 gauge, 7 inch U. C.	
nested	13.00

T-Joint Made Up

6 inch, 28 ga.	per doz. \$3.40
----------------	-----------------

REGISTERS AND FACES

Floor Registers

Except Cast Iron	40 & 10%
Cast Iron	20%

Baseboard

2-Piece	40 & 10%
1-Piece	40-10 & 20%

Adjustable Ventilators

Adjustable Cold Air Faces	40 & 10%
Adjustable Ventilators	40 & 10%

RIDGE ROLL

Galv. Plain Ridge Roll, b'd'd	75-15-5%
Galv., Plain Ridge Roll, crated	75-15%

SCREWS

Sheet Metal	
7, 1/2 x 1/4, per gross	\$0.52
No. 10, 1/2 x 3/16, per gross	0.65
No. 14, 1/2 x 1/4, per gross	0.88

SHEARS, TINNERS' AND MACHINISTS'

Viking	\$22.00
Lennox Throatless	
No. 18	35%
Shear blades	10%
(I. o. b. Marshalltown, Iowa.)	

SHOES

Galv. 28 Gauge, Plain or Corrugated, round flat crimp	60%
26 gauge, round flat crimp	45%
24 gauge, round flat crimp	15%

SNIPS

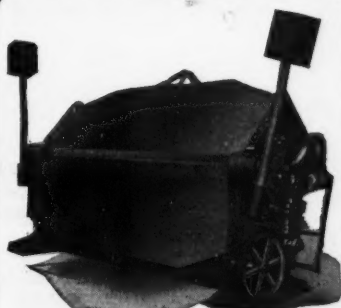
Tinners'	Net
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VENTILATORS

Standard	30 to 40%
Milcor	Net

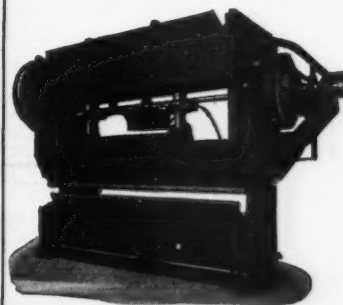
CHICAGO STEEL BENDING BRAKES AND FORMING PRESSES

The perfected result of over 30 years experience in the manufacture of sheet metal bending machines. Over 25,000 machines in use.



POWER BRAKE

Hand Brakes
Cornice Brakes
Power Brakes
Box and Pan Brakes
Forming Presses
Special Brakes and Presses



FORMING PRESS

The most complete and up-to-date line of sheet and plate bending and forming machines in the world. Lengths, 3 to 16 feet, with capacity to bend from the lightest metals up to $\frac{3}{4}$ in. plate, cold.

DREIS & KRUMP MANUFACTURING CO.

7404 Loomis Street • Chicago

Rush Service
on All Warm
Air Heating Supplies
~
REGISTERS

Complete Stocks
of Materials
and Supplies

Galvanized
& Black
Anaconda Copper
Toncan Iron

ROCKFORD SHEET STEEL CO.

Rockford, Illinois

Try Us for
Speedy Service

**SHEET
STEEL
SERVICE**



Order a trial can now—it
will not sour—keeps any
length of time.

**A new furnace paste
FOR BETTER, NEATER
AND QUICKER WORK**

Non-Cereal—Non-Souring

Asbestos Paper will not absorb it
as it does cereal pastes. Paper does
not become soggy—not so apt to
tear.

Larco Mineral Paste does not turn
brown—no stains—mice will not
touch it either when moist or dry
and it does not gum up the hands.
Larco Paste can be kept on hand
mixed ready for use. It has great-
er covering qualities. It slips eas-
ily but adheres permanently.

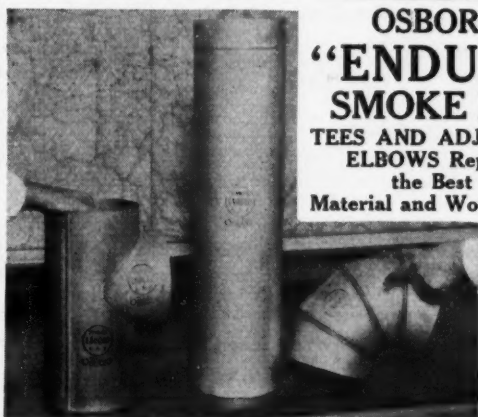
Write for circular which tells all
about it—get Larco prices.

WESTERN MINERAL PRODUCTS CO.

OMAHA

(Formerly Larsen-Bennett Co.)

NEBRASKA



**OSBORN'S
"ENDURO"
SMOKE PIPE
TEES AND ADJUSTABLE
ELBOWS Represent
the Best of
Material and Workmanship**

~
Write
for
Printed
Matter
with
Prices

The J. M. & L. A. Osborn Co.—Detroit—Cleveland—Buffalo

A One-Piece Cast Iron Furnace

THAT'S what you have in effect when
you set a furnace with METALUTE.
It contains a large percentage of iron
which, combined with its thermal qual-
ities, makes it unexcelled for sealing
furnace joints. It has practically the
same coefficient of expansion as iron
and therefore will not crack or dis-
integrate.

Send \$2.40 for a 12 lb. trial
can. Money refunded if not
entirely satisfactory.

TECHNICAL PRODUCTS Co.

Pittsburgh (15400000) Pennsylvania

CEMENT LUTES SAUER SAUER COMPOUNDS GLAZES

Manufacturers also of INSA-LUTE
(Liquid Porcelain) for double sealing
furnace joints, and COLOR-BESTOS,
a protective coating in colors



Mention AMERICAN ARTISAN in your reply—Thank you!

BUYERS' DIRECTORY

Air Cleaners

American Fdy. & Furnace Co.,
Bloomington, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Warm Air Furnace Fan Co.,
Cleveland, Ohio
Watt Mfg. Co.,
Sterling, Ill.

Air Washers

A. Gehri & Co., Tacoma, Wash.
Watt Mfg. Co.,
Sterling, Ill.

Aluminum Sheets

J. M. & L. A. Osborn Co.,
Cleveland, Ohio

Asbestos—Liquid

Technical Products Co., Pittsburgh, Pa.

Bearings

Fafnir Bearing Co., New Britain, Conn.

Blast Gates

Berger Bros. Co., Philadelphia, Pa.

Blower Bearings

Fafnir Bearing Co., New Britain, Conn.

Blowers—Furnace

American Fdy. & Furnace Co.,
Bloomington, Ill.
American Machine Products Co.,
Marshalltown, Iowa
A. Gehri & Co., Tacoma, Wash.
Brundage Co., Kalamazoo, Mich.
Lakeside Co.,
Hermansville, Mich.
Warm Air Furnace Fan Co.,
Cleveland, Ohio
Watt Mfg. Co.,
Sterling, Ill.

Bolts—Stove

Lamson & Sessions Co.,
Cleveland, Ohio
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.

Brakes—Bending

Dreis & Krump Mfg. Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
Peck, Stow & Wilcox Co.,
Southington, Conn.

Brakes—Cornice

Dreis & Krump Mfg. Co., Chicago, Ill.

Brass and Copper

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co.,
Waterbury, Conn.
Copper & Brass Research Association,
New York, N. Y.
Revere Copper & Brass, Rome, N. Y.

Bronze

Revere Copper & Brass, Rome, N. Y.

Cans—Garbage

Diener Mfg. Co., G. W., Chicago, Ill.
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio

Castings—Malleable

Fanner Mfg. Co., Cleveland, Ohio

Ceilings—Metal

Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Chaplets

Fanner Mfg. Co., Cleveland, Ohio

Cleaners—Vacuum

Brillion Furnace Co., Brillion, Wis.
National Super Service Co.,
Toledo, Ohio

Copper

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co.,
Waterbury, Conn.
Revere Copper & Brass, Rome, N. Y.
Rockford Sheet Steel Co.,
Rockford, Ill.

Cornices

Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Cut-offs—Rain Water

Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Dampers—Quadrants—Accessories

Aeolus Dickinson, Chicago, Ill.
Hart & Cooley Co., Holland, Mich.
Howes Co., S. M., Boston, Mass.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., New York, N. Y.

Dampproofings

Lastik Products Corp., Pittsburgh, Pa.

Damper Regulators

Sheer Co., H. M., Quincy, Ill.

Diffuser—Air Duct

Aeolus Dickinson, Chicago, Ill.

Drills—Electric

Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
J. M. & L. A. Osborn Co.,
Cleveland, Ohio
The Stanley Electric Tool Co.,
New Britain, Conn.

Drive Screws—Hardened Metallic

Parker-Kalon Corp.,
190 Varick St., New York

Dust Eliminator

Dustless Ash Co., Muskegon, Mich.

Eaves Trough

Barnes Metal Products Co.,
Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Chase Brass & Copper Co.,
Waterbury, Conn.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.
Rockford Sheet Steel Co.,
Rockford, Ill.

Elbows and Shoes—Conductor

Apex Gutter Hanger Corp.,
New York, N. Y.
Barnes Metal Products Co.,
Chicago, Ill.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.
Rockford Sheet Steel Co.,
Rockford, Ill.

Fittings—Conductor

Barnes Metal Products Co.,
Chicago, Ill.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Fluxes—Soldering

Kester Soldering Co., Chicago, Ill.

Furnace Cement

Connors Paint Mfg. Co., Wm.,
Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.
Technical Products Co., Pittsburgh, Pa.

Furnace Chain

Hart & Cooley Co., Holland, Mich.

Furnace Cleaners—Suction

Brillion Furnace Co., Brillion, Wis.
National Super Service Co.,
Toledo, Ohio

Furnace Fans

A-C Mfg. Co., Pontiac, Ill.
American Fdy. & Furnace Co.,
Bloomington, Ill.
Brundage Co., The, Kalamazoo, Mich.
Lakeside Co., Hermansville, Mich.
Robinson Co., A. H., Massillon, Ohio
Warm Air Furnace Fan Co.,
Cleveland, Ohio
Watt Mfg. Co.,
Sterling, Ill.

Furnace Filters

Warm Air Furnace Fan Co.,
Cleveland, Ohio

Furnace Paste

Western Mineral Products Co.,
Omaha, Neb.

Furnace Pakers

Fanner Mfg. Co., Cleveland, Ohio

Furnace Pulleys

Hart & Cooley Co., Holland, Mich.

Furnace Regulators

Minneapolis-Honeywell Regulator
Co., Minneapolis, Minn.
Sheer Co., H. M., Quincy, Ill.
Tisch, Inc., Charles, Brooklyn, N. Y.
White Mfg. Co., Minneapolis, Minn.

Furnace Rings

Forest City-Walworth Run
Foundries Co., Cleveland, Ohio

Furnace Switch—Automatic

Payne Furnace & Supply Co.,
Beverly Hills, Cal.

Furnaces—Gas

Calkins & Pearce, Columbus, Ohio
Lennox Furnace Co.,
Marshalltown, Iowa
Mueller Furnace Co., L. J.,
Milwaukee, Wis.
Payne Furnace & Supply Co.,
Beverly Hills, Cal.
Robinson Co., A. H., Massillon, Ohio
Rudy Furnace Co.,
Dowagiac, Mich.
Wise Furnace Co., Akron, Ohio

Furnaces—Oil Burning

Motor Wheel Corp., Heater Div.,
Lansing, Mich.

Furnaces—Warm Air

Agriola Furnace Co.,
Gadaden, Ala.
American Fdy. & Furnace Co.,
Bloomington, Ill.
American Furnace Co.,
St. Louis, Mo.
The Beckwith Co.,
Dowagiac, Mich.
Brillion Furnace Co.,
Brillion, Wis.
Enterprise Boiler & Tank Works,
Chicago, Ill.
Farris Furnace Co.,
Springfield, Ill.
Forest City-Walworth Run Fdy.,
Cleveland, Ohio
Fox Furnace Co.,
Elyria, Ohio
Henry Furnace & Fdy. Co.,
Cleveland, Ohio
Langenberg Mfg. Co.,
St. Louis, Mo.
London Furnace Co.,
London, Ohio
Lennox Furnace Co.,
Marshalltown, Iowa
Syracuse, N. Y.
May Flebeger Furnace Co.,
Newark, Ohio
Meyer Furnace Co., The, Peoria, Ill.
Midland Furnace Co.,
Columbus, Ohio
Motor Wheel Corp., Heater Div.,
Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co.,
Mt. Vernon, Ill.
Payne Furnace & Supply Co.,
Beverly Hills, Cal.
Premier Warm Air Heater Co.,
Dowagiac, Mich.
Peerless Foundry Co.,
Indianapolis, Ind.
Rybolt Heater Co.,
Ashland, Ohio
Rudy Furnace Co.,
Dowagiac, Mich.
Standard Fdy. & Furnace Co.,
De Kalb, Ill.
Success Heater Mfg. Co.,
Des Moines, Iowa
Schwab Furnace & Mfg. Co.,
Milwaukee, Wis.
Waterman-Waterbury Co.,
Minneapolis, Minn.
Western Steel Products Co.,
Duluth, Minn.
Wise Furnace Co.,
Akron, Ohio

Gas Burning Attachments

Calkins & Pearce, Columbus, Ohio
Munkel-Rippel Heating Co.,
Columbus, Ohio

Grilles

Auer Register Co., Cleveland, Ohio
Harrington & King Perforating Co.,
Chicago, Ill.
Hart & Cooley Co., New Britain, Conn.
Tuttle & Bailey Mfg. Co., Chicago, Ill.

Guards—Machine and Belt

Harrington & King Perforating Co.,
Chicago, Ill.

Handles—Boiler

Berger Bros. Co., Philadelphia, Pa.

Handles—Soldering Iron

Hyro Mfg. Co., New York, N. Y.

Handles—Furnace Door

Fanner Mfg. Co., Cleveland, Ohio

Hangers—Eaves Trough

Apex Gutter Hanger Corp.,
New York, N. Y.
Berger Bros. Co., Philadelphia, Pa.
Chase Brass & Copper Co.,
Waterbury, Conn.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Heat Regulation Systems

Minneapolis-Honeywell Regulator
Co., Minneapolis, Minn.
Tisch, Inc., Charles, Brooklyn, N. Y.
Sheer Co., H. M., Quincy, Ill.
White Mfg. Co., Minneapolis, Minn.

Heaters—Cabinet

Fox Furnace Co., Elyria, Ohio
Mt. Vernon Furnace & Mfg. Co.,
Mt. Vernon, Ill.
Motor Wheel Corp., Heater Division,
Lansing, Mich.
Payne Furnace & Supply Co.,
Beverly Hills, Cal.
Waterman-Waterbury Co.,
Minneapolis, Minn.

Heaters—School Room

Meyer Furnace Co., The, Peoria, Ill.
Western Steel Products Co.,
Duluth, Minn.
Waterman-Waterbury Co.,
Minneapolis, Minn.

Humidifiers

Automatic Humidifier Co.,
Cedar Falls, Iowa
Diener Mfg. Co., G. W., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Sheer Co., H. M., Quincy, Ill.
J. L. Skuttle Co., Dowagiac, Mich.

Lath—Expanding Metal

Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Machines—Crimping

Bertsch & Co., Cambridge City, Ind.

Machinery—Culvert

Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Machines—Tinsmith's

Bertsch & Co., Cambridge City, Ind.
Dreis & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co.,
Marshalltown, Iowa
Osborn Co., The J. M. & L. A.,
Cleveland, Ohio
Ryerson & Son, Inc., Jos. T.,
Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co.,
New Britain, Conn.
Whitney Mfg. Co., W. A.,
Rockford, Ill.

Metals—Perforated

Harrington & King Perforating Co.,
Chicago, Ill.

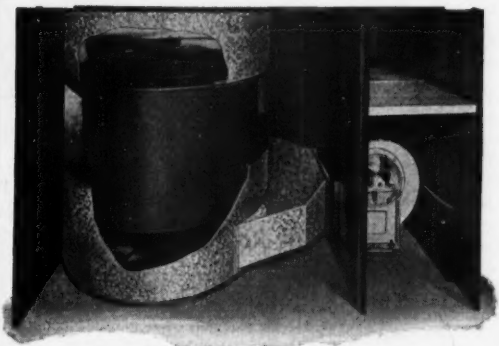
Miters—Eaves Trough

Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Milcor Steel Co.,
Mil., Canton, Chgo., La Crosse, K. C.

Nails—Copper and Brass

Chase Brass & Copper Co.,
Waterbury, Conn.
Revere Copper & Brass, Rome, N. Y.

(Continued on page 62)



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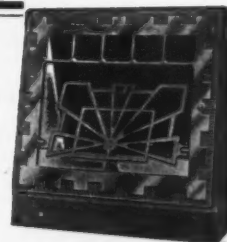
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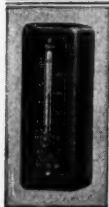
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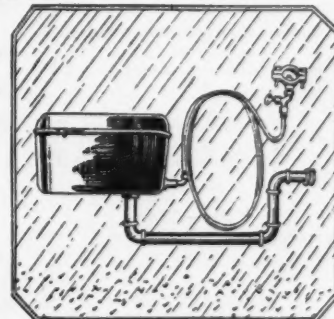
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BUYERS' DIRECTORY

(Continued from page 60)

Nails—Hardened Masonry
Parker-Kalon Corp., New York, N. Y.

Oil Burners
Berryman System of Oil Heating, Inc., Chicago, Ill.
Bettendorf Mfg. Co., Bettendorf, Iowa
Bock Oil Burner Co., Madison, Wis.
McIlvaine Burner Corp., Evanston, Ill.
Silent Automatic Corp., Detroit, Mich.

Paint
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Perforated Metals
Harrington & King Perforating Co., Chicago, Ill.

Pipe and Fittings—Furnace
Henry Furnace & Fdy. Co., Cleveland, Ohio
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peerless Foundry Co., Indianapolis, Ind.

Pipe and Fittings—Stove
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Pipe—Conductor
Barnes Metal Products Co., Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Punches
Bertsch & Co., Cambridge City, Ind.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
W. A. Whitney Mfg. Co., Rockford, Ill.

Punches—Combination Bench and Hand
Hyro Mfg. Co., New York, N. Y.

Punches—Hand
Hyro Mfg. Co., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

Putty—Stove
Connors Paint Mfg. Co., Wm., Troy, N. Y.

Radiator Cabinets
Hart & Cooley Co., Holland, Mich.

Ranges—Gas
The Beckwith Co., Dowagiac, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Registers—Warm Air
Auer Register Co., Cleveland, Ohio
Forest City-Walworth Run Foundries Co., Cleveland, Ohio
General Products Corp., Indianapolis, Ind.
Hart & Cooley Co., Holland, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Ku-No Register Mfg. Co., St. Louis, Mo.
Lamneck & Co., W. E., Columbus, Ohio
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Mueller Furnace Co., Milwaukee, Wis.
Rock Island Register Co., Rock Island, Ill.
Symonds Register Co., St. Louis, Mo.
Tuttle & Bailey Mfg. Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

Register Shields
General Products Corp., Indianapolis, Ind.

Registers—Wood
American Wood Register Co., Plymouth, Ind.
Auer Register Co., Cleveland, Ohio
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Regulators—Heat
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
H. M. Sheer Co., Chicago, Ill.
White Mfg. Co., Minneapolis, Minn.

Ridging
American Rolling Mill Co., Middletown, Ohio
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Rivets—Stove
Lamson & Sessions Co., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Rods—Stove
Lamson & Sessions Co., Cleveland, Ohio

Rolls—Forming
Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

Roofing Cement
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Lastik Products Corp., Pittsburgh, Pa.

Roof Paints
Lastik Products Corp., Pittsburgh, Pa.

Roof—Flashing
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Roofing—Iron and Steel
American Rolling Mill Co., Middletown, Ohio
Central Alloy Division, Republic Steel Corp., Youngstown, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Roofing—Tin
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Taylor Co., N. & G., Philadelphia, Pa.

Rubbish Burners
Hart & Cooley Co., New Britain, Conn.

Schools—Sheet Metal Pattern Drafting
St. Louis Technical Institute, St. Louis, Mo.

Schools—Warm Air Heating
St. Louis Technical Institute, St. Louis, Mo.

Screws—Hardened Metallic Drive
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screws—Hardened Self-Tapping, Sheet Metal
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Parker-Kalon Corp., 200 Varick St., New York

Screens—Perforated Metal
Harrington & King Perforating Co., Chicago, Ill.

Scuppers
Aeolus Dickinson, Chicago, Ill.

Shears—Hand and Power
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Peck, Stow & Wilcox Co., Southington, Conn.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.

Sheet Metal Screws—Hardened, Self-Tapping
Parker-Kalon Corp., 200 Varick St., New York

Sheets—Alloy
International Nickel Co., New York, N. Y.
Republic Steel Corp., Youngstown, Ohio

Sheets—Black and Galvanized
American Rolling Mill Co., Middletown, Ohio
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Republic Steel Corp., Youngstown, Ohio
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
Taylor Co., N. & G., Philadelphia, Pa.

Sheets—Iron
American Rolling Mill Co., Middletown, Ohio
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Republic Steel Corp., Youngstown, Ohio
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Sheets—Tin
Taylor Co., N. & G., Philadelphia, Pa.

Shingles and Tiles—Metal
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Sifters—Ash
Diener Mfg. Co., G. W., Chicago, Ill.

Sign Equipment—Electric
Metal Products Co., Milwaukee, Wis.

Sky Lights
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Snips
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Solder—Acid Core
Kester Solder Co., Chicago, Ill.

Solder—Self-Fluxing
Kester Solder Co., Chicago, Ill.

Solder—Rosin Core
Kester Solder Co., Chicago, Ill.

Solder
Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Soldering Coppers
Revere Copper & Brass, Rome, N. Y.

Soldering Furnaces
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Specialties—Hardware
Diener Mfg. Co., G. W., Chicago, Ill.

Stars—Hard Iron Cleaning
Fanner Mfg. Co., Cleveland, Ohio

Tinplate
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Taylor Co., N. & G., Philadelphia, Pa.

Tools—Tinsmith's
Bertsch & Co., Cambridge City, Ind.
Dries & Krump Mfg. Co., Chicago, Ill.
Hyro Mfg. Co., New York, N. Y.
Interstate Machinery Co., Chicago, Ill.
Osborn Co., The J. M. & L. A., Cleveland, Ohio
Peck, Stow & Wilcox Co., Southington, Conn.
Rockford Sheet Steel Co., Rockford, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.
The Stanley Electric Tool Co., New Britain, Conn.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

Torches
Diener Mfg. Co., G. W., Chicago, Ill.
Ryerson & Son, Inc., Jos. T., Chgo., N. Y., St. L., Det., Cleve.

Trade Extension
Copper & Brass Research Association
National Association of Flat Rolled Steel Manufacturers, Cleveland, Ohio

Trimnings—Stove and Furnace
Fanner Mfg. Co., Cleveland, Ohio

Vacuum Cleaner—Furnace
Brillion Furnace Co., Brillion, Wis.
National Super Service Co., Toledo, Ohio

Ventilators—Floor
Aeolus Dickinson, Chicago, Ill.

Ventilators—Roof
Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Paul R. Jordan & Co., Indianapolis, Ind.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

Ventilators—Ceiling
Hart & Cooley Co., New Britain, Conn.
Henry Furnace & Fdy. Co., Cleveland, Ohio

Wood Faces—Warm Air
Auer Register Co., Cleveland, Ohio
American Wood Register Co., Plymouth, Ind.
Milcor Steel Co., Canton, Chgo., La Crosse, K. C.

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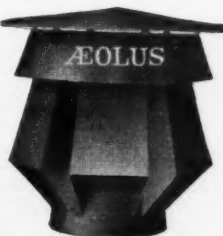
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WANTS AND SALES

Yearly subscribers to the **AMERICAN ARTISAN** may insert advertisements of not more than fifty words in our Want and Sales Columns **WITHOUT CHARGE** for three insertions.

Such advertisements, however, must be limited to help or situation wanted, tools or equipment for sale, to exchange or to buy, business for sale or location desired, and must reach our office ten days prior to date of publication. This privilege is not extended to manufacturers or jobbers—or those making a business of buying and selling used machines—employment agencies and brokers.

When sending advertisement state whether your name or blind number is to be used.

SITUATION WANTED

Situation Wanted—Thoroughly experienced sheet metal worker, expert on soda fountain work, having specialized in this type of work for some years. Would be most valuable to shop doing new or repair work on soda fountains, restaurant equipment, range hoods, etc. Have also had thorough experience in general sheet metal jobbing and warm air furnace heating. Especially neat worker, capable, steady, reliable, and sober. Wants steady job and will go anywhere, large or small town. Address F-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

This is addressed to a manufacturer who harps on quality furnaces and intelligent installations. If such a manufacturer needs a sales manager or assistant sales manager, I would like to hear from him. For ten years I helped market a well known furnace. Served in sales promotion and advertising departments, as a salesman, and as branch manager. Thorough investigation as to character and ability invited. Communications strictly confidential. Address A-529, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Have traveled Wisconsin for prominent furnace company of St. Paul, have had ten years of specialty selling experience, and have worked Minnesota, Wisconsin, North and South Dakota, and Montana territory and have large acquaintance throughout this territory. Can figure house plans for warm air furnace work, and am familiar only with cast furnaces. Married, steady, reliable and sober. Address C-529, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By good combination mechanic, heating, plumbing and metal. Good salesman; would prefer job in shop when I can be at home part of time. Last 9 years on road installing heating and plumbing. Would like small town in South. Address B-529, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By an all-round sheet metal worker. Can handle any branch of the trade, such as cornice, skylight, ventilation and furnace work. Can make estimates and can run the shop. Address T-527, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

Situation Wanted—Sheet metal worker, thoroughly experienced in ventilating, cornice, skylight, hotel and restaurant equipment, boiler breeching, blowpiping, and general all-round work, wants steady position. Thorough knowledge of Triangulation. Can lay out any kind of work. Practical, steady worker. Can do acetylene and electric spot welding. Also experienced in warm air heating installation. Address D-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By man 38 years of age, with 15 years' experience in the warm air heating field, as salesman for a reliable furnace manufacturing company or salesman and engineer for a dealer. Can do own layout and drafting, also capable of handling forced air jobs. Can furnish best of references. Address P-527, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By all-round tinner and warm air furnace installer. Especially good on furnace work. Union or non-union shop. Prefer to locate in a general combination shop in a small town. Good, steady, reliable worker. Will go anywhere. Address W-527, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Illinois.

Situation Wanted—By first-class sheet metal and ventilation estimator and salesman. Thorough mechanic, pattern cutter and layout man. Employed at present but not satisfied. Would like to make connections with the idea of becoming interested in the business later. Address K-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By sheet metal worker. Experienced in general lines, cornices, heating and special work. Good pattern cutter and shop man. Neat and accurate mechanic. Health and habits are good. Can take charge if required. Address S-527, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Factory engineer or traveler open for immediate connection. Can cope with any emergency in the warm air heating field. Exceptionally qualified. Familiar with cast and steel alike. Address H-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Sheet metal worker, plumber and heating man, first class man in all branches of the trade, wants position. Sober, reliable, steady man, fully able to take charge of work. Good on gas installations and duct work. Address C-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—Want to represent good firms that manufacture a good line of cast furnaces, steel furnaces, furnace fittings, registers, fans, humidifiers, heat regulators, furnace putty, and all tin shop and furnace shop supplies. Address J-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By an A-1 mechanic; 28 years' experience in ventilating, heating and general job work. Will accept position in small town at \$30 a week. Best of references furnished. Address R-527, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

SITUATION WANTED

Situation Wanted—By tinner and furnace man. Can handle anything along these lines. Strictly temperate and reliable. Permanent position desired. Address E-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

Situation Wanted—By radiator repair man. Can also do welding and tin work. Can come any time. Address G-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

BUSINESS CHANCES

For Sale—Hardware business, established 20 years. Best location in town of 3,000; paved streets, waterworks. Good payroll. Farming community. Stock and fixtures invoice \$5,000. Good going business in one of the best towns in Missouri. "Grab" this before someone beats you to it. Have other business, reason for selling. Address B-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

For Sale or Exchange—Will exchange a 240 acre farm in north central Iowa corn belt for an up-to-date hardware stock. Will take stock from \$10,000 to \$12,000 as first payment and would prefer northwestern Iowa or southern Minnesota location in town from 4,000 to 10,000 population or larger. This is an A-1 farm. Address T-528, **AMERICAN ARTISAN**, 139 N. Clark St., Chicago, Ill.

HELP WANTED

Wanted—Sheet Metal Worker experienced in high class manufacturing for foreman in new Kalamein door and sheet metal factory. We are making money, have orders and need a man who will invest three to five thousand dollars. If you have the money, some business experience, and are between 35 and 55 years of age, write for full details. Address Pro Bert Mfg. Co., 2239 Oros Street, Los Angeles, Calif. X-528

Wanted—We need a sheet metal worker and a furnace man. A man that is steady and reliable, who understands heating and ventilating blue prints, and understands how to read blue prints. It is a steady job for the right man. Address Iverson Hardware Co., Vermilion, S. Dak. W-528

BOOKS

Here are the two books that most sheet metal workers and contractors classify as the most complete books on Sheet Metal Pattern Cutting. The Universal Sheet Metal Pattern Cutter, Vol. 1, deals with every phase of inside work, including Heating, Ventilating, Blower and Exhaust Piping Connections, Marine Sheet Metal Work, Automobile Sheet Metal Work, Machinery and Belt Guards, etc., Mensuration applied to Sheet Metal Work, etc., with many features of construction and Labor-Saving Methods are also given in detail.

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Mention **AMERICAN ARTISAN** in your reply—Thank you!

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For Sale—8-foot Double Truss Brake, one 30-inch Square Shear, one 30-inch. Forming Rolls, Crimper, Beader, Niagara Elbow, Small Turner, Bench Shears, all in A-1 condition. Priced for quick sale at \$150. Address Charles Y. Nellis, 705 Franklin St., S., Robinson, Illinois. X-527

For Sale—Tinnerns tools including 30" square shears, 30" rolls; 30" stove pipe folder, 20" rolls; 20" bar folder, bench shears, and several small machines and stakes. Write for complete list if interested. Prices right. Will sell all or part. Address Lee and Seymour, 346 Russell St., Madison, Wis. Z-528

For Sale or Trade—One model "T" Ford with wheels extended back two feet with an 8-foot box all equipped for ladders. Has an extra shift. All in good condition. Just the thing for a Sheet Metal Shop or Hardware. If interested, write L. T. Peterson, Denison, Iowa. Y-527

Wanted—One 30" or 36" squaring shear, Pexto make, in A1 condition and priced right. Address John P. Nelson, 647 South Belknap St., Mexia, Texas. L-528

For Sale—One No. 16 Lennox Throatless Shear with two sets of blades. Price \$50.00. Address Mehl Brothers Sheet Metal Works, Coffeyville, Kans. M-528

Wanted—One steel forming machine 30" wide, 2" rolls. Must be in good shape. State price in first letter. Address Ideal Tin Shop, Osakis, Minn. Y-528

BOOKS

Manual of Automotive Radiator Construction and Repair, by F. L. Curfman and T. H. Leet—Anyone interested in Radiator Repairing will find the 185 pages of practical instructions and 120 illustrations showing actual construction and repairing a big help. In a condensed manner some four to five thousand answers to questions are given. It is thoroughly practical, as both authors are men of wide experience in this work. Printed in large, easy to read type. Measures 5 3/4 x 9 inches. Price \$2.50. Order from Book Department, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

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PATENTS

HUBERT E. PECK
Patent Attorney
Barrister Bldg., WASHINGTON, D. C.

Wanted—Warm air furnace heating engineer 30 to 35 years of age. One who can make blueprint layouts, has had installation and factory experience and has reasonable amount of sales ability. Prefer the ambitious hard working type that has the necessary ground work and can develop and grow as time goes on and more experience is had. Address Armstrong Furnace Co., Columbus, Ohio. R-528

FURNACE SALESMAN

You can earn extra money and render your dealers, customers, and the industry a genuine service by selling them Allen's Standard Code Charts. With this book any dealer can estimate quickly and accurately according to the Standard Code. Excellent Holiday gift for your favored customers. Must be seen and used to be appreciated. Will earn many times its cost of \$5.00 on single job. Special discount on dozen lots. Let me send you sample copy for inspection. Money back if not pleased. Address O. C. Allen, Greenfield, Ind.

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Department Heads and Salesmen

By a large department store chain for plumbing, heating, hardware and paint department. Permanent position, with opportunities for advancement, for men who are qualified by experience to plan jobs and have complete knowledge of the operation of a country hardware department. All replies must be complete as to experience, age, past and present salary. Address O-528, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

SPECIAL NOTICES

Wanted—Experienced Furnace Cement salesman; must be acquainted with furnace manufacturers and jobbers, for Metalute (plastic iron). Comes in powder form—not a mud cement. Negotiations now on with prominent furnacemen to replace old style mud cements. Address Technical Products Co., 2308 Main St., Pittsburgh, Pennsylvania. S-528

MISCELLANEOUS

We are open for an Exclusive Agency on Roof Paint in the states of New York and New Jersey. Address Stove Manufacturing Corporation, 184 Mulberry St., Newark, N. J. E-528

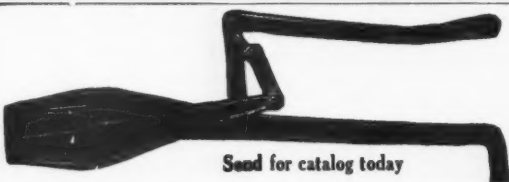
For Sale—Sheet Metal Design and Pattern Drafting Course. Address D-528, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

BOOKS

The Revised Edition of the New Metal Worker Pattern Book by Kittridge and Associates is one book that should be in every shop. As a reference book alone it is indispensable. Over 500 9x11-inch pages with 895 illustrations. It covers the principles underlying practically every problem that is likely to come up in daily practice. Beginning with the selection and use of drawing tools, the author explains linear and geometrical drawing so clearly that one who has had no previous knowledge of arithmetic or drawing may understand these essentials and apply them. The most approved methods of pattern cutting are also given in the course of the work... Price, \$6.00, postpaid. Order from the Book Dept., AMERICAN ARTISAN, 139 N. Clark St., Chicago, Ill.

Exhaust and Blow Piping, by Hayes—Exhaust and Blow Piping has had an unusually big demand. A fresh supply is now off the press and is in our hands for immediate delivery. It has an invaluable treatise on the planning, cost, estimation and installation of fan piping in all its branches, giving all necessary guidance in fan work blower and separator construction. 159 pages, 5x8. 51 figures. Cloth. \$2.00. Order from Book Department, AMERICAN ARTISAN, 139 N. Clark St., Chicago, Illinois.

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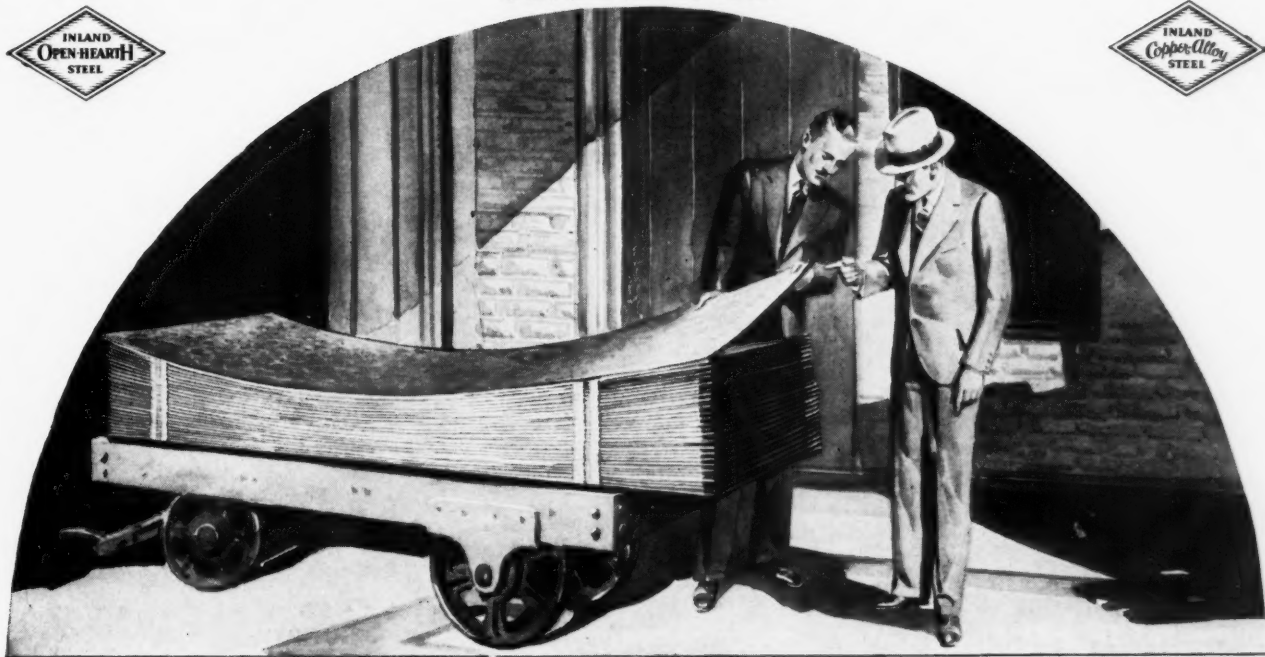
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